GAS JOURNAL, JAN. 25, 1939

VOL. 225. 91st YEAR. No. 3949.

Editorial Notes

Realism in Selling Gas

"I BELIEVE in obtaining a good profit from the sale of appliances where competitive situation permits and where a sufficiently strong demand exists through necessity or can be created through the desire to possess, rather than endeavouring to create a demand through rendering goods available at unnecessarily low prices, especially in these days of easy payments." This point was made by Mr. A. E. Chadwick, Controller of Gas Sales to the Metropolitan Gas Company of Melbourne, in a Paper he presented at the recent Convention of the Australian Gas Institute. Unnecessarily low prices do tend to provoke competitors into making offers which eventually lead to senseless and wasteful competition; and—this is important—they foster the antagonism of merchants and plumbers, whose friendship and co-operative working it should be our aim to encourage. But a great deal depends on the interpretation of a "good profit." This must be reasonable, not excessive; and it should be an agreed profit. The diversity of practice between gas undertakings—some of whose areas are contiguous—in this regard cannot be in the best interests of the Industry. There should be a generally agreed policy, if not national, at least regional—a policy which stimulates the interest of dealers in the sale of modern gas appliances and makes them anxious to display them to good advantage in their showrooms.

Provided the installation work is carried out by the gas undertaking or under its supervision and to its satisfaction, then it is wise to maintain a reasonable margin of profit and to avoid the undercutting which at one time was necessary to eliminate unsatisfactory and even dangerous installation work. But looked at broadly from the Industry's point of view, there is, apart from the aspect of co-operative dealing, no reason why in an age of intense competition any profit should be sought. The "profit" as far as the gas undertaking is concerned should go towards the payment of fixing charges and maintenance. The consumer is buying an appliance to use the gas undertaking's commodity, and if the transaction shows no loss to the undertaking, then there should be satisfaction. Installation of an appliance is the first step only in the supply of a heat service; it is the opening of a new sales avenue.

Like ourselves, Mr. Chadwick is a strong advocate of hire purchase selling, which he terms a "painless method of effecting sales," and we do not quarrel with his contention that the rates should be such as to cover the full complement of charges involved. That they should show a profit, however, is another matter. Long term hire-purchase at rates about equivalent to those fixed for simple hire is the order of the day, and the system of hire purchase gives the consumer a sense of possession—that eventually he will have a tangible asset in the appliance he is buying. But there are circumstances where a rental scheme becomes necessary to induce the consumer to have gas appliances installed—where, for example, tenants are not prepared to finance the purchase and installation of appliances in their landlords' properties, where, again, tenants do not know from month to month how long they will occupy their present dwellings. Cash purchase, hire purchase, simple hire—each has its place in the selling policy of a gas undertaking.

Load Value of Appliances

READERS will recollect the Paper read by Mr. Tennyson-d'Eyncourt, of Tottenham, to the London and Southern District Junior Gas Association a year ago and published in the "JOURNAL" for Jan. 26, 1938. In that highly interesting, though perplexing, Paper the Author gave the results of an investigation to determine the load value of appliances as expressed by the consumption each represents. This basis, of course, does not take account of the incidence of the different types of consumption on the distribution system—no account of the difference in cost of satisfying heavy demands for short periods as distinct from a steady, continuous load. The way in which the Author tackled the problem was by "subtraction." He compiled the consumption statistics covering a period of twelve months of consumers in the same area, both ordinary and prepayment, having different groups of appliances installed in their homes. The consumer with cooker only was taken as the common factor. Then, from the different combinations of appliances in use he arrived at the average consumptions in cubic feet per annum accounted for by each appliance. As we said at the time, the results of the investigation were very surprising. We hope that since then he has continued the investigation and will let the Industry have the benefit of further results.

Now Mr. Chadwick has carried out similar work in the area of supply of the Metropolitan Gas Company of Melbourne.

Figures were taken on appliances used by over 1,000 consumers. They were selected as a cross-section of typical ordinary meter consumers, including high class residential areas, middle class houses, suburban villas and cottages, and workmen's houses in poorer class villas and cottages. In common with Mr. d'Eyncourt, Mr. Chadwick took the average cooker consumption as the basis for computing the consumption—we should say the added load—due to further appliances installed. It is interesting to compare the results with those obtained at Tottenham. In doing so it must be borne in mind that the calorific value of the gas supplied at Melbourne is 536 B.Th.U. per cu.ft. while that at Tottenham is 500 B.Th.U., but this difference can be ignored in what can at best be only the broadest of comparisons. The first point to note is that the basic figure of cooker consumption, varying from 14,000 to 18,000 cu.ft. in Melbourne, with an average of 16,000 cu.ft., tallies closely with the Tottenham figure of 17,600 cu.ft. per annum. It indicates, we suggest, the firm public acceptance of gas as a medium for cooking when one considers the vast numbers of gas cookers which are installed both here and in Australia. The "bath heater" in Mr. Chadwick's account is equivalent, we imagine, to the "single-point appliance" in the Tottenham results. Here again the figures are not too far apart—Melbourne 6,900 cu.ft., Tottenham 5,300 cu.ft. a year. The sink heater shows a remarkable discrepancy. For Melbourne the annual consumption is a matter of 990 cu.ft.; for Tottenham, 5,000 cu.ft.

Comparisons

INSTANTANEOUS water service, too, shows marked divergence. By this term we take it that Mr. Chadwick implies the multi-point heater. The respective consumption figures are: Melbourne 17,000 cu.ft., Tottenham 6,600 cu.ft. As for storage water service the Melbourne figure of 26,900 cu.ft. compares with the Tottenham figure of 40,000 cu.ft.; the gas fire is credited, at 5,300 cu.ft., with practically double the consumption of a gas fire at Tottenham; the copper is credited with 6,400 cu.ft. at Melbourne, 3,900 cu.ft. at Tottenham.

Commenting on the far greater consumption of gas with the storage system as compared with the instantaneous system—figures borne out at Tottenham—Mr. Chadwick suggested that the customers choosing instantaneous systems are often frugally inclined, and in many cases have not yet acquired the habit of the daily bath. Customers choose the instantaneous system keeping in the back of their minds the fact that their habits will make for greater economy with this type of heating. To our mind, however, the most interesting fact which emerges from analysis of the results of the two investigations is that the total consumption figures of all the appliances we have mentioned are practically identical. The actual figures are 79,500 cu.ft. in Melbourne and 81,100 cu.ft. at Tottenham. Does this mean that the consumptions of the different appliances—apart from the cooker, which appears stabilized—depend on the different sales methods employed, on the varied degree to which the sale of a particular appliance is pushed? And there is another thought: Does the similarity of the two figures indicate that, on average, the consumer is prepared to pay so much, and little or nothing more, for his gas? We are thinking not of his all-in fuel bill, to which the same question applies, but of his gas bill. It all seems to point in one direction—that the total average gas consumption figure will not increase substantially unless gas is offered on a two-part tariff or other attractive method of charge which will enable the consumer to displace solid fuel by gas without incurring an all-in fuel bill greater than formerly, or, if it does exceed that sum, an amount which the consumer is willing and able to pay for the added convenience and labour saving of gaseous fuel.

The sales section of the Metropolitan Gas Company was re-organized just over three-and-a-half years ago. That this re-organization was well planned will be obvious from the extract of Mr. Chadwick's Paper which we publish on later pages of our issue to-day. On all sides everything has been done in a thorough manner, and the good results which have accrued are not really surprising. They certainly enabled Mr. Chadwick to write in optimistic vein—though not over-optimistic, for he realizes what competition means. The Author gave a tell-tale record of equipment installed in new buildings during the twelve months ended June 30 last. In 3,744 new residences completed, 3,701 gas cookers were installed (compared with 34 electric), 2,918 gas hot water installations (338 electric), 3,269 gas coppers (11 electric), 430 gas fires (10 electric), and 35 gas refrigerators (35 electric). These figures show how unmistakably gas is preferred for cooking, how little is the pull of electricity in the heating field, but also how necessary it is that we should watch the water heating load. We have not done nearly enough to cultivate this load. Admittedly the gas hot water installations represent 78% of the total houses equipped; but electricity, on cost, ought not to have a look-in on this load.

Outdoor Selling

MR. CHADWICK had a good deal to say on the merits of outdoor selling, and we would call particular attention to this aspect of gas sales. He spoke of the possible unsatisfactory results of adopting the "cold canvass" door-to-door method employing canvassers working mainly on a commission basis having only superficial knowledge of the goods being sold. Gas salesmen must know their business well enough to give sound advice to the consumer. Service must keep pace with sales, and we have emphasized many times the need for the proper training of sales personnel. Mr. Chadwick explained the methods employed by the Metropolitan Company of Melbourne—well trained salesmen on adequate salary and some measure of bonus as encouragement to extra effort. He also expressed his great belief in the prospect bonus system for employees. The prospect card system has, of course, worked excellently in this country. As an indication of the value of the Melbourne prospect-bonus scheme, the Author mentioned that in the twelve months ended June last employees provided the Company with 13,964 prospects, from whom 5,119 orders were secured. Bonus payments amounted to nearly £1,000. "After having had considerable experience in controlling salesmen who have been paid in different ways," observed Mr. Chadwick, "I have never found the commission system produce superior results to properly controlled and organized selling on a stabilized income basis."

We would also call attention to the Author's remarks on the value of organizing special intensive selling campaigns—concentrated drives for particular appliances. Mr. Chadwick shares our view that installation prices should in the first instance be fixed, so that an all-in figure can be quoted by the salesman to the consumer. This is not difficult to arrange, and what is lost on the swings is gained on the roundabouts. It is undoubtedly a great advantage to be able to tell the customer what an appliance will cost him, including fixing. It makes the clinching of sales far easier and more businesslike. The details of a few of the sales drives in Melbourne given in the Paper are very interesting. In a water-heater campaign,

for example, the Metropolitan Company booked more orders in one month than in any previous twelve months, and the appliances installed have, as was to be expected, had a snowball effect on sales. Mr. Chadwick's Paper showed how alive is the Metropolitan Gas Company, how well equipped both in organization and personnel to meet competition successfully and increase the goodwill of the Gas Industry.

Meeting Changing Conditions

EQUALLY is the Australian Gas Industry forging ahead on the technical side to meet changing conditions. The Paper at the Convention by Mr. R. S. Andrews, Chief Chemist of the Metropolitan Company, gave plenty of indication of this. Our pages have on several occasions recorded the results of research carried out by the Company. The Paper by Mr. C. F. Broadhead to The Institution of Gas Engineers in 1937 is an example. Reference to that Communication was made by Mr. Andrews. It will be recalled that Mr. Broadhead, who has done so much splendid pioneer work on complete gasification plant, expressed the opinion that the cultivation of the domestic coke market should be abandoned—that the Industry should become more and more a supplier of gas and gas only. This policy has really been forced upon the Company by the increasing difficulty of disposing of coke in competition with brown coal briquettes and of tar in competition with imported bitumen. Conditions in the Melbourne area are very different from those obtaining in Great Britain, nor, would it appear, are they representative of Australia as a whole, for only recently the Australian Gas Light Company, of Sydney, installed complete coke screening plant and is pursuing a gas-cum-coke policy.

The Paper by Mr. Andrews was concerned with the composition of town gas and its relation to distribution and utilization. It dealt with the possibility of improving the physical properties of gas through its composition. Mr. Andrews maintained that complete gasification, coupled with intense cooling, produces a gas of a composition more favourable for distribution and general usage than that obtained from direct carbonization of coal. "It is," he said, "regarded as a duty by those engaged in research to endeavour to live a stage in advance of those occupied with the normal operations of control, so that the ideas of to-day may become the accomplished facts of to-morrow. Not only does the gas from complete gasification show an improvement in composition, but it opens the way for the production of a gas which very nearly approaches the ideal." Mr. Andrews was discussing a gas made from coal and oil, a gas having a calorific value of 525 B.Th.U. per cu.ft. The methane content of such a gas is 18%, compared with a methane content in the neighbourhood of 28% for coal gas produced by direct carbonization. In the final sentence of the paragraph we have quoted it would appear that he has in mind a large increase in the methane content of complete gasification gas.

Methane is, of course, a gas with wonderful combustion characteristics, and the Gas Industry in this country is concentrating on research on the complete gasification and the hydrogenation of coals and coke under pressure. We should all like to see the all-gas era. We are pressing forward with work in an attempt to bring this about. But the cost factor cannot be dismissed; and at the moment it cannot be gainsaid that in Great Britain the efficient marketing of coke enables gas to be offered more cheaply than would otherwise be possible. The sale of coke is rendering the all-gas house a practical proposition.

200 B.Th.U. Gas

From the *Nuneaton Observer* of Jan. 20 we learn that some "wonderful demonstrations" are to be staged at Nuneaton, that the Directors of the Nuneaton Gas Company are "taking steps to bring before the inhabitants of Nuneaton and the country generally the blessings and benefits of the new town gas." The notice of these forthcoming demonstrations is given in the paper over the signature of Mr. George Helps, who sets out their objects as follows:

(1) That Warwickshire coal is eminently suitable for the production of town gas. (2) That Warwickshire coal requires less purifying than the coals at present being used for gas making, and that the gas being produced from it at Nuneaton Gas-Works is cleaner and healthier than the richer gases. (Dr. G. E. Foxwell and other experts will discourse during the demonstrations on this point. (3) It will be proved at the demonstrations that coal requires to pass through about four processes before complete combustion can take place in it, whereas complete combustion with gas need only pass through one stage. (4) That if gas such as that produced at Nuneaton is supplied to domestic consumers at something like 5d. per therm it can be used in lieu of all coal and so abate entirely all domestic smoke to the benefit of health and the general well-being of the town. (5) That it is believed gas for industrial use can be supplied for most if not all industrial purposes in Nuneaton, such as brick burning and the generation of electricity, at no greater cost than coal. (6) That the gasification of coal before use is of the utmost importance to the country, not alone because of its economy, but because by so doing valuable oils are recovered, which otherwise are lost.

Other points are: (7) That electricity, wonderful as it is, cannot be said to be related to coal, nor has it any single characteristic of carbon. Electricity is entirely a mechanical product without the slightest element of nature in it. It is so different from coal gas, which, of course, retains all the elements of coal without its dirt. Gas is the clean invisible essence of coal. (8) For the generation of electricity coal is not necessary. Electricity can be produced from water power or oil engines, just as cheaply as from coal, and not one ounce of coal need be used in its production. (9) Town gas, on the other hand, cannot be produced by any other known means than coal. (10) That while coal produces a most attractive domestic fire, it is not a fuel suitable for economic use in its raw state. Coke produces a good domestic fire, but it is much better when lighted by gas and kept alight by it. (11) Town gas as supplied at Nuneaton Gas-Works is the best form of coal. (12) Electricity, it is believed, can be much more cheaply produced through gas than by coal. (13) If gas could be produced from electricity there would be very little if any use for coal. (14) That the whole of Warwickshire coal is suitable for the production of town gas. Further, the whole of its present output could be used for town gas purposes, within a reasonable area of the coalfields concerned. (15) That cheap gas—gas at the price of coal—means better health and living conditions generally through the total elimination of smoke, greatly increased trade, better conditions of labour, and full work for the whole of the miners at present working in the pits.

The "GAS SALESMAN"

Continuing in the brightest of vein the current issue of the "GAS SALESMAN" was published on Saturday last. Its format is attractive; its contents are lively without in any way sacrificing solid value and usefulness. The field of salesmanship in the Gas Industry ever becomes wider, but the "SALESMAN" has kept pace with development, and the activities of all Gas Industry salesmen are covered. Sales news of the month is presented to enable readers to keep in touch with current events, to be knowledgeable about the work of the Industry they serve. Specially contributed articles on the factors which make a good gas salesman, on the use of gas for industrial operations, on the coke market, and on the incidence of competition from coal supplement the regular features, such as the American Notes by that gas enthusiast "Columbus Junior" and "A Woman's Viewpoint." Then, as usual, much space is devoted to our reports of the meetings of the B.C.G.A. Salesmen's Circles. The salesman in the Gas Industry is thoroughly well catered for by a newspaper dealing solely with his interests.

Letters to the Editor

British Industries Dinner-Ball

SIR,—I feel that many of the readers of the "GAS JOURNAL" who are exhibitors at the British Industries Fair will like to know of an opportunity to help the British Women's Hospitality Committee in promoting the friendliness between the ordinary men and women of all the nations which is steadily growing despite, perhaps indeed because of, events beyond their own control.

Under the patronage of Queen Mary, buyers and exhibitors at the British Industries Fair will meet together at a Dinner-Ball to be held at Grosvenor House on March 1, the second Wednesday of the Fair.

The attractions are manifold. Miss Cicely Courtneidge and Mr. Jack Hulbert have very kindly promised to appear in the carbaret; there will be side shows such as the Bootleggers' Den; and dancing goes on until three in the morning to Sidney Lipton's Band.

Among the many distinguished guests who will be received by Mrs. Neville Chamberlain will be the Duchess of Gloucester; the Lord Mayor of London and the Lady Mayoress, his sheriffs and their ladies; the Lord Mayors of Birmingham, Bradford, Leeds, Leicester, and Nottingham; and the Lord Provost of Aberdeen and Lady Provost. The arrival of the Duchess of Gloucester and of the Lord Mayor and Lady Mayoress of London will be heralded by a fanfare from trumpeters of the Life Guards.

Tickets for the evening, including the dinner (with soft drinks) and the running buffet, are 25s. to exhibitors and 30s. to others. I shall be most happy to send on as many as are required to readers of the "GAS JOURNAL" if they will apply to me at 17, Chesham Street, Belgrave Square, S.W. 1.

Yours, &c.,
SARITA VANSITTART,
President,
British Women's Hospitality Committee.

Jan. 21, 1939.

A Platform for Debate—Modern Gas *v.* Ancient

SIR,—The other day a man remarked to me that the people who labour should govern. He referred to Members of Parliament and the Government. I asked him how he defined "labour." He answered at great length. I think he meant that labour was *doing something continuously* which was better done than left undone. If this is anything like a true definition it could only be used as a signpost by ordinary mortals—pointing to a "never never land."

At the Institution Meeting last June certain people sought to put up a direction post for 500 C.V. gas, and even suggested the elimination of carbon monoxide. To me this is sheer madness—but I may be wrong.

You were good enough to support my suggestion for a platform in your issue of Oct. 26 last.

I have laboured, not continuously but not far short of it, for 20 odd years for much cheaper gas and other things. Please try to find a few—say, a dozen or two—men who combined would meet all my arguments and settle the matter. May I assure you I shall never give in, and my purpose is to prove my case by every means at my disposal.

Much cheaper and better gas would lead to greatly increased trade, and so to a better and healthier country. Remember that most town gas, whatever its quality, *is the best form of coal.* The snag is that people cannot use gas freely as it should be used, because those responsible will not produce it at a price which would allow it to be sold and burned to the exclusion of coal for all domestic and most industrial purposes.

Yours, &c.,
GEORGE HELPS.

Nuneaton Gas Company,
Queen's Road, Nuneaton,
Jan. 23, 1939.

Obituary

A large number of his friends were present at the funeral of Mr. C. H. MITCHELL on Wednesday, Jan. 18, at Roundhay, Leeds. Mr. Mitchell served the Leeds Corporation Gas Department for fifty years, and from 1918 to his retirement in 1932, he was Assistant Manager. He was held in the highest esteem by everybody with whom he came into contact, as the presence at the funeral of every one of the male staff who had been associated with him testified.

Perhaps the most trying period of Mr. Mitchell's fifty years was during the war, when Mr. W. B. Leach, then Engineer and General Manager, was loaned to the Admiralty and Mr. Mitchell had to carry on the working of the Department with a very much depleted staff due to the calls made upon the younger generation by the Forces. The year before the war the plant had been reported obsolete, but reconstruction was interrupted. Nevertheless, Mr. Mitchell ensured a continuous and satisfactory supply of gas. Since then the old plant has been scrapped and the Works brought up-to-date.

So has passed a man well-known and respected in the Industry; it was said of him that he was the friend of all and enemy of none.

Joint Gas Conference at the Fair

The following are the arrangements for the Joint Gas Conference of the B.G.F. which is to be held from Feb. 28 to March 2 at the Birmingham Section of the British Industries Fair.

Tuesday, Feb. 28, 1939.

11.15 a.m.	Assembly in the Conference Hall, British Industries Fair, when the Chair will be taken by the President, the Rt. Hon. Lord Kennet, G.B.E., D.S.O., D.S.C.
11.30 a.m.	Official welcome to members by the Lord Mayor of Birmingham (Alderman J. S. Crump, J.P.), and the President of the Birmingham Chamber of Commerce (The Earl of Dudley, M.C.).
	Presidential Address by Lord Kennet.
1.0 p.m. for 1.15 p.m.	Official Luncheon in the Bradford Dining Room (adjoining the Gas Section).
2.30 p.m. for 2.45 p.m.	Assembly in the Conference Hall, when the Chair will be taken by Mr. R. Robertson, M.Inst.C.E., President of The Institution of Gas Engineers.
	Display of Gas Publicity Films in the Conference Hall.

Wednesday, March 1, 1939.

10.15 a.m.	Assembly in the Conference Hall, when the Chair will be taken by Mr. R. Robertson.
10.30 a.m.	Short papers on "The Retention and Development of the Domestic Load," as follows:—
	"Space Heating," by Mr. G. E. Currier, Bradford.
	"Cooking," by Mr. G. Dixon, B.Eng., M.Inst.C.E., Nottingham.
	"Water Heating," by Mr. W. W. Townsend, Colchester.
	"Lighting and General Appliances," by Mr. W. Clark Jackson, M.I.Mech.E., Neath.
	Contributions by Representatives of the Society of British Gas Industries.
	Discussion.
2.45 p.m.	Display of Gas Publicity Films in the Conference Hall.

Thursday, March 2, 1939.

	The Morning Session has been left open for the Inspection of Exhibits at the Fair.
2.45 p.m.	Display of Gas Publicity Films in the Conference Hall.

NOTES.

TRANSPORT TO AND FROM THE FAIR.

'Buses will leave the Chamber of Commerce, New Street, Birmingham, every few minutes for the Fair, and, in addition, a special service of trains will be run from New Street Station to Castle Bromwich Station, which adjoins the Fair.

ENGINEERS' CLUB

Members attending the Conference are invited to accept the hospitality of the Engineers' Club, Neville House, Waterloo Street, Birmingham. They will become Honorary Members for the period of their stay and will receive a card on application at the Club.

Mr. T. P. Ridley, of Newcastle-on-Tyne, was to have presented a Paper on the Wednesday on "Space Heating," but finds himself unable to do so. At short notice Mr. G. E. Currier, of Bradford, has kindly agreed to take his place.

News of the Week

The National Physical Laboratory Abstract of Papers published in the year 1937 is now available from H.M. Stationery Office, price 1s., postage extra.

Estimates for the Ensuing Year were considered recently by the Manchester Gas Committee. They assessed their expenditure for the twelve months at £1,083,700, and the expected income will be £1,202,200. After allowing for renewals of plant there should be a credit balance of £118,500. The Committee say that though the cost of coal has increased by about £100,000 per annum since 1935, every effort is being made to avoid an increase in the price of gas.

Eight Officials and Workmen of Messrs. Clayton, Son, & Co., Ltd., had each the pleasure of receiving on Wednesday last at the hands of Mr. Joseph Clayton a gold medal suitably inscribed, along with twenty War Savings Certificates, to mark the Company's appreciation of forty years worthily spent in the Company's service. The following were recipients: Leonard Hartley (Director), R. W. C. Pickering (estimator), W. Birkinshaw (riveter), J. F. Brown (blacksmith), M. W. Nelson (electrician), J. W. Wells (plater), A. Wilson (stores and tackle), and H. Young (boilermaker).

The Increasing Use of Gas in Industry was the subject of an article by Mr. W. H. Johns (Engineer and Manager of the Swansea Gas Light Company) in a recent Trade and Industrial Supplement to the *South Wales Evening Post*. As an indication of what is going on all over the country, Mr. Johns pointed out that manufacturers in Sheffield, the centre of the steel trade, are using 135% more gas than they purchased six years ago; in Stoke-on-Trent, the centre of the pottery trade, the increase in the use of gas by industrial purposes has risen by no less than 442% in the last five years.

A Reduction in the Price of Gas to prepayment consumers has been agreed by the Rhyl Urban District Council. As from April 1 the price will be reduced by 2d. per 1,000 cu.ft. Mr. T. C. Williams (Vice-Chairman of the Council) opposed the proposal. He said the price of gas in Rhyl was as low as in many bigger towns, and the average price was between 3s. 6d. and 4s. per 1,000 cu.ft. The capital cost of the Gas Undertaking was not borne by merely gas consumers. The town as a whole had helped to pay for it, and if the Council had something to give away, it should give it to the ratepayers as a body, and not to one section. Mr. J. Thornley (Chairman of the Gas Committee) said that 75% of the consumers paid for their gas through prepayment meters, and the Committee felt that it was they who had made the Gas Department pay.

The Bolton Corporation Gas Department has inaugurated a series of six weekly lectures in practical domestic cookery designed for "engaged young ladies."

Plans for New Offices and Showrooms were approved on Jan. 16 by the Buckhaven and Leven Gas Commissioners for Leven. The present property at North Street is to be reconstructed.

Among the Objects of a Special Order for which the Bridgend Gas Company intends to apply to the Board of Trade under the Gas Undertakings Acts, 1920 to 1934, is an extension of the existing limits of supply.

December was the Best Month for the Darlington Gas Department in the history of the undertaking, according to a report of the Gas Engineer and Manager (Mr. A. E. Ruffhead). During the month 71,427,000 cu.ft. of gas was used by Darlington consumers.

A Mobile Showroom operated by the Walsall Gas Department is now touring various districts. Strikingly designed in a flame and yellow colour scheme, the vehicle—adapted from a Corporation 'bus—contains a selection of domestic gas appliances. The cost of equipping the vehicle has been less than £100.

The Well-Known Racehorse Owner, Mr. J. B. Joel, has recently installed gas lighting in the seven horse boxes at the Ayres End Stud, near Harpenden. The installations consist of 2-light burners with wire globes and "Newbridge" switches. *The Co-Partner* (Watford and St. Albans) labels this as "horse-sense."

Sanction has been Received by the Dewsbury Gas Department for a loan of £10,000 for gas mains and services, and £4,000 for new stores buildings. The second of two new gasholders has now been put into use. This is of the spiral type, having a capacity of 600,000 cu.ft. and was built by Messrs. Clayton, Sons, & Co., Ltd., of Leeds, at a cost of £12,000.

A Closely Guarded Secret was revealed on Jan. 18, when in the Gas Offices, Parliament Street, members of the Nottingham City Council, city officials, and friends assembled at the invitation of the Nottingham Gas Committee. Mr. George Dixon, Gas Engineer, in welcoming the guests to the new theatre, explained that it had been built for demonstration purposes. He mentioned that there was a separate entrance to the premises which would enable the theatre to be used privately for cinema entertainment or other purposes. The new splendidly appointed demonstration theatre, which has seating accommodation for 150 persons, is handsomely furnished in scarlet and chromium. Six films taken from the film library of the B.C.G.A. were shown.

Institution of Gas Engineers

Members of The Institution of Gas Engineers will be welcome at the undermentioned Meetings:

Three Cantor Lectures to be held at the Royal Society of Arts, John Street, Adelphi, W.C. 2, on Jan. 30, Feb. 4 and 11, at 8 p.m. The Subject of the three Lectures will be "Achievements of British Chemical Industry in the Last 25 Years," and will be given by Sir Gilbert T. Morgan, O.B.E., D.Sc., LL.D., F.R.S. (Director of the Chemical Research Laboratory, Teddington). The Lectures will be illustrated by lantern slides. Tickets can be obtained on application to the Secretary of The Institution of Gas Engineers.

Special General Meeting, March 14.

A Special General Meeting of the Institution will be held at Gas Industry House, 1, Grosvenor Place, S.W. 1, on Tuesday, March 14, at 6 p.m. A Paper will be presented for discussion on "The Deterioration of Coal on Storage" by Mr. James Jamieson and Mr. W. J. Skilling (Communication No. 201).

Light refreshments will be served between 5.30 and 5.55 p.m.

Autumn Research Meeting.

The date of the Autumn Research Meeting has been altered from Nov. 7 and 8 to Nov. 21 and 22.

The 4th Dinner of the British Gas Federation will be held on Monday, Nov. 20.

New York World's Fair.

A cordial invitation has been received from the Executive Board of the American Gas Association to members of the Institution to visit the New York World's Fair, April 30 to Oct. 30, and the Golden Gate International Exposition in San Francisco, Feb. 18 to Dec. 2.

It is planned to hold the Annual Convention of the American Gas Association in New York on Oct. 9 to 13, and Monday, Oct. 9, has been designated officially as Gas Industry Day at the World's Fair. Members of the Institution will be particularly welcome at these meetings.

The Canadian Gas Association, which is affiliated with the American Gas Association, has extended an invitation to members of the Institution to visit Canada at the same time.

At the Fair the Gas Industries Building will contain exhibits of gas utilization and of gas burning appliances, but demonstrations of gas utilization will not be confined to this Building. Moreover, gas will be used throughout the buildings operated by the Fair Corporation for cooking, water heating, and space heating.

The Council of The Institution of Gas Engineers has decided not to organize an American Visit in connexion with these meetings and Exhibitions. It would be glad, however, to know of any members of the Institution who are intending to visit the U.S.A. at or about the time of the Convention.

New Coking Plant for East Hetton Collieries

An entirely new by-product coking plant is to be installed by East Hetton Collieries, Ltd., at Trimdon Grange (Co. Durham). The existing waste-heat ovens are to be demolished and the new plant which is to be erected on the same site will be arranged on modern lines and will comprise new equipment throughout.

The contract for the whole of the work, including the demolition of the present ovens, the installation of the new by-product coking plant, new boiler plant, and all electrical equipment has been placed with Simon-Carves, Ltd., of Cheadle Heath, Stockport.

The eighteen ovens will be of the Simon-Carves "Underjet" rich gas type, capable of carbonizing 400 tons of raw coal per day, with a complete by-product plant, including benzole rectification, and a plant for dealing with crude benzole obtained from other sources. Coal-handling plant will be installed for taking washed small coal from the existing Simon-Carves washery to new blending bunkers of 1,400 tons capacity and thence to a 400-ton service bunker. There will also be a coke-handling and screening plant for the preparation of foundry coke and three domestic sizes.

Simon-Carves' contract also includes steam-raising plant comprising three Lancashire boilers, superheaters, and water softening plant. The boilers will be fired either by surplus gas, coke breeze, or both. A gas compression plant for delivering surplus gas to the West Hartlepool Gas Company's mains and the usual gas meters and testing equipment is included in the contract.

Merits of Gas as an Investment

Mathiesons' Handbook

Though we must all hope it will be very long before the unhappy experiences of last year in the world of finance are repeated, no one who may be anxious to "read" the future from an investment point of view can afford to ignore what has "gone before." It is, indeed, essential for an investor to make himself acquainted with the history of industries and undertakings in which he may contemplate taking an interest—somewhat in the same way that a sportsman studies "form." Thus "Mathiesons' Handbook for Investors," which records the Stock Exchange prices and dividends for the past ten years of many hundreds of selected securities, and has reached its fortieth year of publication, is always assured of a cordial welcome. A copy of the 1939 edition (price 5s. net) has been sent us by Messrs. Frederick C. Mathieson & Sons, of 16, Copthall Avenue, London, E.C. 2, together with their "Investor's Pocket List of Reference Tables," published at 1s.

A glance at the section of the "Handbook for Investors" which sets out particulars relating to more than a dozen important gas companies, and at what was said under the heading of "Stocks and Shares" in the "JOURNAL" Review of 1938 which appeared a fortnight ago, will do nothing to weaken the opinion of those who have faith in the merits of the Gas Industry, when compared with others, for purposes of investment, though, under the trying circumstances, "it could not," as we said, "be expected that gas stocks and shares would come through the year 1938 unscathed."

Factories, Truck, and Shops Acts

An Invaluable Reference Book

A new edition of Redgrave's well-known work on the Factories, Truck, and Shops Acts has been published by Messrs. Butterworth & Co. The Editor is Joseph Owner, Barrister-at-Law.

This is a book which should prove of the utmost utility to the Gas Engineer and Manager. It is clearly printed, and of most convenient size for a quick reference. The book contains the new Factories Act, so many of the provisions of which apply to gas-works. The Act is carefully annotated, and the various orders issued under the Act are also included. The book sets out the various Truck Acts, which still have an important bearing upon the relation of the employer and employed. Another section is devoted to the various Shops Acts, which would apply to showrooms belonging to gas undertakings. There is scarcely any part of this book which would not be of assistance to a Gas Manager in an emergency.

Further Acts which are contained and annotated are the Celluloid and Cinematograph Film Act, 1922, the Lead Paint Act, 1926, the Young Persons Employment Act, 1938, and many other Acts to which those responsible for the working of a gas-works may have occasion from time to time to refer.

We have no hesitation in commending this excellent manual to all who are responsible for the good working and management of a gas undertaking. It is published at 30s.

Salesmen Visit Edmonton

Guests of Messrs. Glover & Main, Ltd.

A visit of the B.C.G.A. Home Counties (Western District) Salesmen's Circle was paid to the works of Messrs. Glover & Main, Ltd., at Edmonton, on Jan. 17. The meeting was attended by upwards of forty members, including the Engineers and Managers from Newbury and Wantage, Messrs. J. P. Thompson, and R. H. Barnard, respectively. The party was received at the Gothic Works by Colonel W. R. Glover, C.M.G., D.S.O., Mr. C. Marley, Mr. S. Wilson, Mr. H. F. Potter, Mr. G. F. Jenkins, Mr. W. O. Shildrick, and Mr. Arthur Forshaw, M.Sc.

Following an inspection of the meter-making and repair departments of Messrs. Thomas Glover & Co., Ltd., where the up-to-date machinery and methods were much admired, the members were entertained at lunch, and afterwards conducted round the foundry and plant set out for the production of "Main" enamelled cookers and other appliances. Great interest here was shown in the firm's new cabinet cooker, the No. 57, which has a number of very outstanding new features, and other new lines of the firm. A good deal of time was also spent in examining the vitreous enamelling plant, which is understood to be one of the largest and best equipped in the Kingdom.

Following Colonel Glover's welcome to the members at lunch, Mr. J. P. Thompson, in the much regretted absence of the Chairman of the Circle, Mr. J. W. Kaye, on account of indisposition, expressed the thanks of all members for the opportunity afforded them to visit Gothic Works and for the kind way in which the Directors of Messrs. Glover & Main, Ltd., and their works and sales officials had received them. They had spent a most interesting and instructive day, which added to the admiration many of them had always felt for the firm's products and business methods.

Catching Them Young

Ipswich Demonstrations for Children

IN an effort to educate the rising generation in the value of services offered by gas and gas appliances, a series of demonstrations for scholars aged nine to sixteen was held in the Ipswich Gas Light Company's new Demonstration Theatre at Carr Street, Ipswich, during the Christmas Holiday, from Jan. 2 to Jan. 6, inclusive.

Performances were given for boys in the mornings and for girls in the afternoons. The programme for boys included B.C.G.A. films—"The Man Who Knew Too Little," "Dinner Hour," "Two Frightened Ladies," "Happy in the Morning," &c., supported by one or two cartoons. In addition, a short sketch entitled "Breakfast" was given by two members of the staff, including the Cookery Demonstrator. This, an original effort, depicted the efforts of a somewhat ingenuous young man to get his own breakfast when left alone unexpectedly. A certain amount of knockabout humour was included in this part of the sketch. The second part consisted of a demonstration of getting breakfast easily with the aid of gas. The Cookery Demonstrator played the part of a neighbour who called in to see how the young man was getting on. This sketch proved popular and amusing, and enabled an effective short propaganda talk to be put over subsequently.

The programme for the girls at the afternoon session was very similar to that for the boys, except that a short straight cooking demonstration was given instead of a sketch. The Cookery Lecture included the making of fruit buns to a set recipe. A simple competition was organized for the girls (boys were invited to enter if they wished), in which competitors were asked to make and submit six buns, similar to those made by the Demonstrator. Prizes of 5s., 3s. 6d., and 2s. 6d. were offered, and 56 entries were received, including three from boys, one of whom took third prize.

The general standard of the buns was very high and probably equalled that which would have been submitted by adult competitors. In view of the number of entries, additional prizes of boxes of chocolates were also given. Every competitor was given a Mr. Therm pastry cutter.

Altogether during the week approximately 1,500 children attended the demonstrations, and there was a great demand for the tickets which were issued for each performance. The children had to obtain these at the showrooms on previous days.

Long Service with Messrs. George Glover

To serve any one Company continuously for over forty years is always a noteworthy achievement. This, however, is a record which can be claimed by both Mr. J. J. Perry and Mr. W. D. Clark (of Messrs. George Glover & Co., Ltd., Ranelagh Works, Chelsea), who have now retired after 53 and 42 years' service, respectively.

On Jan. 9, Mr. H. M. Thornton, Chairman, on behalf of the Directors of the Company, presented both Mr. Perry and Mr. Clark with suitably inscribed gifts and stated that the firm, founded 77 years ago, had always been fortunate in having men like them in charge of the practical work. Mr. Perry had been Senior Foreman for 36 years and Mr. Clark for 20 years. He wished them long life and health so that they might thoroughly enjoy their well-deserved leisure.

Mr. C. G. Langford, Director and General Manager, also spoke of the loyal service that these two men continually gave and stated that wherever gas meters were made one would find craftsmen who had served their apprenticeship under Mr. Perry or Mr. Clark.

In acknowledging the gifts, both the recipients recounted some of their early experiences and spoke of the happy lifetime spent in the service of the firm.

Twenty-Three Years Later

York Locates an Early Prize Winner

In 1915, Mr. H. E. Bloor, Managing Director, Engineer, and Secretary of the York Gas Company, inaugurated a series of cookery competition for the girls of York Elementary Schools and the first prize-winner to be awarded the Gas Company's clock was Doris Metcalfe, a girl from Heworth School. Now, twenty-three years after, this expert cook of 1915, married and living in Sheffield, noted in the *Yorkshire Evening Press* of Dec. 17 Mr. Bloor's desire to get into touch with his original first prize-winner and has written him as follows: "I was interested to read in the *Yorkshire Evening Press* of Dec. 17 the account of the gas cookery competition prize distribution, and have pleasure in informing you that I was first prize-winner in the first competition held in November, 1915, while attending Heworth School. The travelling clock and cookery book with which you presented me have indeed been most useful; the former still keeping good time. Since my marriage in 1925 I have done all my baking and cooking successfully by gas.—Doris Putsey (*née* Metcalfe)."

To commemorate the 21st cookery competition held some time ago, the York Gas Company are sending a souvenir of the occasion, in the form of a lady's week-end case, to Mrs. Putsey.

Southport Gas Department

Director of Public Prosecutions Takes Action

A special meeting of Southport Town Council on Jan. 17 passed a resolution that the Gas Engineer (Mr. J. Herbert Clegg) and the Deputy Gas Engineer (Mr. W. E. Plevin) be relieved of their duties with pay until further notice, and that the Mayor be empowered to engage substitutes and any additional staff that may be required.

The Mayor (Councillor W. Geldard) presided at the special Town Council meeting and moved the confirmation of the resolution. Alderman Sir Ernest Hadfield (Chairman of the Finance Committee), seconding, said the resolution was not the one submitted by the Gas Committee. He had been responsible for moving the amendment in the General Purposes Committee, and he had been very much vilified in doing so. He would like the public to know, without prejudice either to the Gas Engineer or his Deputy, that they had given them release from their duties until further orders so that they might devote their time to the preparation of their defence. A prosecution had been prepared by the Director of Public Prosecutions, and it was their duty to observe neutrality.

Sir Ernest went on to appeal to the workmen under the Gas Committee to give the temporary substitutes every assistance.

In the meantime the "JOURNAL" learns that Mr. J. L. Anderson, who recently retired from the Gas Light and Coke Company, has been appointed temporary Gas Engineer at Southport, and that Mr. A. E. Sumner, who is at present in the employment of the same Company, has been loaned to Southport as temporary Deputy Gas Engineer.

Smokeless Coal and Coke

Discussion by Coke Salesmen

At the conclusion of the business of the Third Annual General Meeting of the London and Counties Coke Salesmen's Circle, the Question Box was opened. Among the questions was the following:

> When informed by a consumer that Welsh smokeless coal is being used on a domestic boiler in place of coke boiler nuts, the contention being that Welsh nuts require less attention during the day and burn throughout the night, what inducement is offered by the coke salesmen to endeavour to persuade the consumer to use coke when it is further contended that Welsh coal will go twice as far as coke—in other words, it will need 5s. worth of coke to do the work of Welsh coal costing 3s. 3d.?

It was suggested that the question was one of the relative bulk density of the two fuels. Many consumers judge their fuel consumption by the number of hods of fuel used. This is misleading, as a hod will hold a greater weight of coal than of coke. The matter is also bound up vitally in hot water requirements. Although Welsh coal would maintain a fire over a long period, it would not give the same amount of hot water as coke burning under "banked" conditions. If a consumer is away from home all day but requires the boiler to remain alight during her absence so that it can be quickly "picked up" on her return, Welsh coal might be more convenient, especially if the boiler is small. The coal fired boiler could be shut down to burn at a slower rate than a coke fired boiler. Only an actual comparative test could prove which is the cheaper fuel under the particular conditions required by the consumer. Other things being equal, the best inducement to the consumer to use coke is, of course, its cleanliness in operation without smoke and black dust, and no need for periodical sweeping of the flue.

A member stated that he had carried out duration tests with coke on a small domestic boiler and succeeded in keeping it alight for 42 hours. At the end of that time the water was hot enough for a bath and the fire could be drawn up without the use of the gas poker. It would be interesting to know how coal and anthracite would behave under these conditions. It had to be admitted that in certain cases Welsh coal was best suited to the needs of the consumer, particularly if the boiler was very small.

Forthcoming Engagements

January.

28.—Scottish Western Juniors.—Visit to Parkinson & Cowan, Ltd., Glasgow.

31.—I.G.E.—Joint Committee on Complete Gasification under Pressure, Department of Scientific an Industrial Research Offices, 16, Old Queen Street, S.W. 1, 3 p.m.

February.

1.—London and Southern Juniors.—Visit to Cricklewood Works of British Oxygen Company.

1.—Manchester and District Juniors.—Visit to Staveley Coal and Iron Company, Ltd., Chesterfield.

2.—Midland Juniors.—Paper by F. A. Reynolds, "Some of the Uses for Gas at Wolverhampton."

4.—Scottish Eastern Juniors.—Visit to Messrs. William Dixon's Coke Oven Plant, Govan Ironworks.

6.—L.C.C.A.—Technical Committee, 2.30 p.m.

7.—I.G.E.—Research Executive Committee, 2.30 p.m.

11.—Scottish Western Juniors.—Paper by D. Beavis, of Helensburgh, on "The Modern Domestic Field."

14.—I.G.E.—Finance Committee, 10 a.m.; Membership Committee, 11 a.m.

14.—London and Southern Juniors.—Paper by A. Ronca on the 1937 Factory Act (at the H.O. Industrial Museum).

14.—N.G.C.—Central Executive Board, 2.30 p.m.

16.—S.B.G.I.—Council Meeting, 2.30 p.m.

18.—Scottish Western Juniors.—Annual Whist Drive and Dance.

21.—I.G.E.—Gas Education Executive Committee, 11 a.m.; Gas Education Committee, 2.30 p.m.

21.—I.G.E.—Ad Hoc Committee on Text Books, Gas Industry House, 5 p.m.

23.—Joint Junior Visit to B.I.F.

25.—Scottish Juniors.—Joint Meeting at Edinburgh. Paper by M. Whittaker, of Robert Dempster & Sons, Ltd., on "Gasholders."

25.—Yorkshire Juniors.—Meeting at Barnsley Technical College. Paper by H. K. Lister, of Holmfirth, "Personal Experiences on a Small Gas-Works."

The writer of this article suggests that the review of the activities of the coal interests contributed to the "JOURNAL" under the title "You Have Been Warned," warrants the closest attention from the Gas Industry. He also suggests that the tendency therein disclosed is in direct line with what he wrote early in 1938 in the "JOURNAL" under the title of "The Future Orientation of the Gas Industry"—"JOURNAL" for Jan. 5 and March 16.

Have You Been Warned?

by

"M.Inst.Gas E."

IN the article by the writer in the "JOURNAL" for Jan. 5, 1938, it was pointed out that the greatest need of the Gas Industry was for cheap gas, for gas which *when used by the consumer* is so cheap that it can be burnt to the exclusion of domestic raw coal. This has been done in certain instances, really on the experimental scale, but in general the best that the majority of gas undertakings have been able to achieve has been not the "all-gas" house, but the "all-gas products" house, in which coke has been accepted as an equal partner with gas. Let it be made clear that under present conditions this is the correct policy. Gas undertakings which are content to believe that they cannot make and supply gas cheaply enough to permit of the adoption of a general all-gas house policy must combine the use of coke and gas so that an outlet at good prices may be obtainable for the coke in order to cheapen the production of gas as much as possible.

Established Predeliction.

A policy which is good at the moment may be short-sighted in the long-run. It all depends upon what the consumer wants. To-day the consumer, in the mass, thinks he wants a solid fuel fire, and the coal interests do, and will, play upon this apparently established predeliction, to perpetuate the open coal fire. Anyone who takes the trouble to analyze the latest annual report of the Fuel Research Board, no less than the fulminations of the British Coal Utilisation Research Association, must come to the conclusion that the whole of the coal industry is inimical to gas and is determined by every means within its power to keep raw coal in the domestic grate. It is true that in this movement due account is being taken of smoke pollution of the atmosphere; much of the work of the B.C.U.R.A. is directed to burning coal smokelessly. It is also true that the impetus of research is often greatest at the beginning and loses momentum as time goes on. We may therefore expect to find that the next three years or so will show considerable results and that for a time great use will be made of these results. The discovery *tempo* of the Gas Industry research has meanwhile slowed down, so that in the immediate future the competition of raw coal, due partly to the research discoveries and partly to the use made of them by skilled and intensive propaganda, will far outstrip the greatest efforts that the Gas Industry can make in that direction, *unless the Gas Industry has something of fundamental value to offer to consumers.*

What is that "something of fundamental value"? Let us answer that question in the words of others. Here is the Fuel Research Board in the Report for the year ended March, 1938: "It is not generally possible to obtain coal or coke free from sulphur. . . . From the point of view of atmospheric pollution, the ideal methods of heating and cooking are therefore by gas or electricity, and the more these are used the less will be the pollution from both smoke and sulphur." There is the truth in a nutshell, and it should be emblazoned on the hoardings of every gas undertaking in the country. In a recent work on logic by Mr. R. W. Jepson it was remarked how difficult it is to arrive at the truth. "Information can be arrested, or diverted, or even polluted on its course . . . we allow ourselves to be flattered, and deceived, and bullied, and stampeded, and drugged into thought and action without serious resistance. . . . We would like to see, but prejudice soon blinds us." We have, however, the truth from the Fuel Research Board, though it may not appeal to the raw coal enthusiasts. Gas and electricity are the ideal methods of cooking and heating. In gas, the Gas Industry has something of fundamental value.

The All-Gas House.

This can be taken a step farther by a quotation from the Address to the S.B.G.I. by Colonel Planck, the Chairman for the year. Colonel Planck referred to the gas-and-coke Kensal House, and then to the true all-gas houses in other towns. He went on to say: "It has been established that 100 therms of gas are the equivalent in domestic heating use of 1 ton of house coal. On this basis, the Gas Industry supplies *as gas* no more than 12,000,000 tons of coal annually, leaving the possibility of expansion up to another 35,000,000 tons if the all-gas house could be made generally feasible. The whole social tendency of our generation is in the direction of labour-saving with the elimination of dirt and smoke. The appliance makers have as much to gain from the adoption of this all-gas house policy as have the gas undertakings. It appears to an observer on the fringe of the Industry that the possibility of giving practical effect to this policy is the greatest single problem—because it is the greatest single opportunity—facing the Industry to-day. It seems, rightly or wrongly, that it is not a problem that should be left to a few isolated engineers and managers, but that it should command the attention of a strong body within the Industry set up for the purpose of considering this vital problem and all that it entails."

We are prone to have long sight mentally in the optical sense that we cannot see things clearly in our Industry because of the mass of details with which we are closely encompassed, but we can nevertheless take a long-range view of other industries. Here we have a man who is not encompassed about with the daily problems of the gas engineer, a business man, declaring that the all-gas house policy is *the greatest single opportunity* facing the Industry to-day. He made, moreover, the very reasonable suggestion that a strong body within the Industry should be set up to consider this subject in all its aspects.

Our Opportunity.

The opportunity before the Gas Industry was stated emphatically by the present writer in the "JOURNAL" (*loc. cit.*). It has been put forward again by the Chairman of the S.B.G.I. The consequences of neglect of this opportunity appear to be implicit in the article "You have been warned" to which reference has been made. But has the Industry been effectively warned? Will any notice be taken of the warning? It was Samuel Johnson in his customarily brusque 18th century way of speech who declared: "I have found you an argument; I am not obliged to find you an understanding."

How the all-gas house policy is to be brought into being is another, and more contentious, matter. The present writer, after having considered the matter over the past year since the appearance of his original articles in the "JOURNAL," still unblushingly believes, in the face of every argument, that the Industry should cast overboard any preconceived prejudices (which we have seen from Mr. Jepson's conclusions only blind us to the truth) in favour of any particular quality or character of gas, and should study only the problem: What is the type of gas that gives the best and cheapest service to the consumer having regard to cost of manufacture, of distribution, and of utilization? The process used should produce the minimum of coke, and preferably should be one of total gasification. *At the present time,* the writer cannot see any prospect of producing cheap gas of a C.V. above, let us say, 325 B.Th.U.,

and he sees no objection, and many advantages, in going yet lower. It has been proved in practice that lower C.V. gas is more efficient in use than high C.V. gas; many do not agree with this statement, but that is because they have not tried it for themselves. Dr. Johnson's words spring, unbidden, to mind, but the temptation to requote them here in this polite age must be resisted!

The only really substantial argument that has been raised against the use of gas of lower C.V. than is now customary is that the increased volume that must be transmitted through the pipes would cause immense expense in laying additional mains, especially in older districts where the mains had been laid many years ago for much smaller loads than to-day. This argument was dealt with by the present writer ("GAS JOURNAL" *loc. cit.*) from the point of view of the theory of the flow of gas in mains and was shown to have little foundation. The matter is only raised here because most gas engineers have themselves been able to prove the correctness of the writer's contentions during the present winter. It happens that when the gas requirements of a district are growing, more and more gas must be pushed through the existing mains. This is done without detriment. Many engineers are surprised at the additional quantities that can be transmitted over and above what the mains were originally designed for, provided the mains are clean. During the spell of intensely cold weather mains were very highly "overloaded"—according to preconceived ideas—without the slightest detriment. The writer is informed that where low C.V. gas has been adopted, this is precisely the experience. No additional mains have been necessary, and the little extra pressure required has not been detrimental in any way.

If the use of lower C.V. gas leads to the general adoption of the all-gas house, the immense increase in the volume of gas sold would presumably lead to laying additional mains. But what gas undertaking has been prevented from selling more gas by the consideration that more mains would be needed?

Total Gasification.

This brings us to the subject of total gasification. The internally-heated system put forward by the writer previously ("JOURNAL" *loc. cit.*) was not a system of total gasification, but produced coke for sale, albeit in smaller quantities than the usual process. The subject of providing a suitable process was dismissed in general as one for plant manufacturers to consider.

A new angle has been introduced in the reports of the Fuel Research Board, wherein has been shown the possibility of the complete gasification of coal, without prior carbonization, producing gas having a C.V. of 310 to 325 B.Th.U. per cu.ft. Here are the results recorded in the latest report upon three South Wales coals:

—	Coal 1.	Coal 2.	Coal 3.
Volatile matter in coal	17%	11%	14·5%
Yield of gas, therms per ton	204·8	204·1	206·0
C.V. of gas	305	320	313

The cost of making B.W.G. depends upon the size of the plant and upon local conditions. For a good-sized plant it may well be that the total cost of steam, power, water, stores, repairs and maintenance, labour and capital charges will be covered by 0·8d. per therm of gas. There remains the cost of the coal, which would rarely be less than 1d. per therm, and probably somewhat more.

The importance of this work is that if gas of about 300 B.Th.U. were distributed, a total gasification process would be available which would not require pre-carbonization, and would produce gas at similar costs to those ruling at present.

It is, however, clear that at present we can only visualize the production of gas at costs around 1d. per therm by an internally-heated process producing simultaneously a certain amount of coke for sale. We cannot produce the cheap gas required for the all-gas house unless we also produce coke, the sale of which assists materially in cheapening the cost of gas manufacture. We must therefore concentrate on discovering uses for coke other than the domestic grate or stove in order to take up the surplus production that would follow any considerable movement in the direction of the all-gas house.

It may be, however, that there are other methods, including attractive tariffs, available for the cheapening of gas to the consumer making the all-gas house sufficiently attractive for even restricted purses. It is these considerations that demand united counsels from a committee of unprejudiced gas engineers and commercial men. But we cannot reduce the present costs of manufacturing gas materially unless we adopt low C.V. gas. Nor can we successfully adopt any known or suggested total gasification process for the purpose unless we adopt a materially lower C.V. for the gas than rules to-day, because of the increased cost that must be incurred by carburetting. Carburetting by synthetically produced methane would appear on present evidence to be more expensive than other known methods.

A.R.P. Notes

Fife Discussions with A.R.P. Warden.

Members of the Gas Industry in Fife discussed with Lt.-Col. Lindsay, Chief A.R.P. Warden for the County, steps to be taken for the protection of the Industry in emergency. The meeting took place in Kirkcaldy, Treasurer Bruce (St. Andrews) presiding.

Mr. J. Hodge (County Water Engineer) said the water undertakings in the County had been divided into five districts, and he suggested that similar plans could be adopted for the Gas Industry.

A sub-committee was appointed to consult with the County A.R.P. authorities.

Guarding against Incendiary Bombs.

As a result of the nation-wide drive towards safeguarding the civilian population against possible aerial attack, a new form of structure has come into being. Manufacturers have placed before the public the most suitable materials for this class of work and the contribution which asbestos-cement makes to this campaign is very fully described in an interesting booklet which we have received from Turner's Asbestos Cement Company (Branch of Turner and Newall, Ltd.), entitled "Asbestos-Cement and A.R.P." As is well-known, asbestos-cement possesses many inherent qualities which are very desirable in structures erected for the purpose of fire-resistance, and in this connexion "Turnall" asbestos wood appears to afford the householder an adequate and inexpensive means of safeguarding his property from the threat of the incendiary bomb. Details of how this work may be carried out are given along with a very complete series of photographs of tests made with actual "Thermite" bombs. It would appear from these that "Turnall" asbestos wood affords a very high degree of protection from and resistance to these destructive missiles. Of equal importance is the construction of sound and adequate underground shelters and here "Turnall" building slabs (hollow construction) afford an ideal means of simply and effectively lining the walls and roof of dug-outs. These strong and durable slabs are proof against rot, rust, damp, heat, and cold and will last indefinitely. The manufacturers will be pleased to supply further copies of this informative booklet upon request.

Safeguarding Records.

All gas undertakings have numerous maps and plans indicating the position of mains and other underground works, &c., the loss or destruction of which would cause considerable inconvenience. The Oldham Gas Department are considering the purchase of suitable photographic apparatus so that all important maps and plans may be photographed and the various copies stored in different places.

Electrical Year Book, 1939 Edition*

The section on alternating current systems has been rewritten for this edition of the "Electrical Year Book," in order to provide more concise definitions in familiar terms and to introduce more information of utility to users of alternating current.

Some new matter on exciters has been introduced into the section on turbo-alternators and on single-phase induction motors in the section on induction motors. In view of the regulations regarding meter accuracy and testing, the subject has been accorded new treatment and a note added on approved types. The section on electrical measuring instruments has been revised to include the treatment of the rectifier type. New matter is also included in the treatment of instrument transformers, and there is again some new matter to be found in the section which deals with testing sets, and there is new matter on earth leakage trips.

*London: Emmott & Co., Ltd., 28, Bedford Street, W.C. 2. Price 1s. 6d. net.

Benzole and Allied Products

The revised "Standard Specifications for Benzole and Allied Products" have just been published by the National Benzole Association in book form at a price of 7s. 6d. net.

Specifications for these products were first issued by the National Benzole Association in 1929, and a revised Specification for Motor Benzole in 1932. Improved methods of manufacture and testing, and changes in the requirements of users, necessitate a review of specifications from time to time, and those now issued are the result of a thorough revision of all specifications by a Committee of the Association representative of the Benzole Industry. This Committee, in collaboration with the British Standards Institution, has taken into consideration the requirements of both the manufacturer and the user of the various products. The publication includes the latest relevant methods of testing, as well as schedules of the apparatus required, taken, by the courtesy of the Standardization of Tar Products Tests Committee, from the second edition of "Standard Methods for Testing Tar and Its Products, 1938."

Athletic and Social

Shrewsbury Staff Social.

Representatives of many local interests, headed by the Mayor (Captain Harry Steward), were among the guests at the Shrewsbury Gas Light Company's staff social at Boots on Dec. 18, when references were made to the changes brought about by the acquisition of a controlling interest by the Severn Valley Gas Corporation, which was represented by Mr. G. S. Wood, of Cheltenham.

Mr. C. M. D. Belton (Engineer, Manager, and Secretary) was in the chair, and proposed the health of the Mayor. The Mayor, replying, said he was born mid-way between the Company's office and the electricity works. Both had been and still were great assets to the town, and he hoped they would long continue to thrive side by side. He thought the Company and its staff set before the town a fine example of citizenship.

Mr. C. Crane, proposing "The Guests," referred to the presence of Mr. H. L. Grocott as a representative of the old Board, and said that the members of the staff were grateful for what had been done for them. They were glad to have Mr. Wood with them as a representative of the new order.

Mr. John Smith (Sentinel Waggon Works) replied for the guests.

Proposing "The Shrewsbury Gas Light Company," Mr. Frank Gee, Borough Treasurer, said both gas and electricity rendered great service to the community, and he would like to see more recognition given to the part played by gas. "Mr. Therm" was a tried and faithful friend. While they wished well to the Severn Valley Gas Corporation they would never fail in their affection for the old company and for Mr. Belton, who had played an energetic part in the life of the town.

In reply, Mr. Belton referred to the new regime. He said the Shrewsbury Gas Light Company retained its identity and would go on with its work under Acts of Parliament which went back to 1820. Control of the capital of the Company had been taken over, but local interests would continue to receive full recognition from the Board. They were still a local Company, intensely interested in everything that appertained to the welfare and progress of the Borough, and there had been no transfer of trade to other quarters.

A short whist drive followed, at the close of which Mrs. C. M. D. Belton presented the prizes.

Continued on page 244.

Metallurgical Smoke Abatement - - -

by

H. A. FELLS, B.Sc., Ph.D. (Lond.), A.I.C., A.M.I.Min.E.,

of the Sheffield and District Gas Company.

Discussion on Dr. Fells' Paper, which was given before the Yorkshire Junior Gas Association on Jan. 14, and published in our issue of last week.

The PRESIDENT (Mr. A. Wylie, of Sheffield) said they were glad to have present as visitors Mr. C. S. Shapley, Engineer and General Manager of Leeds Corporation Gas Department, and Past-President of The Institution of Gas Engineers; and Mr. J. Law, Chief Smoke Inspector for the City of Sheffield. Dr. Fells needed no introduction to the Yorkshire Juniors. He was one of themselves and they had had valuable contributions to their Transactions from him before. On this occasion he was speaking not so much on a technical problem concerning the Gas Industry alone but a matter of vital concern to the national welfare and health in which the Gas Industry was playing a most important part. Mr. Wylie believed opinion in the meeting would be unanimous that Dr. Fells that day had contributed a Paper outstanding in quality and truth. He had emphasized the importance of gas as a factor towards improving the health of the nation. He (Mr. Wylie) thought he was hardly making an exaggerated claim in suggesting that the major share of helping to eliminate the smoke nuisance in recent years should go to the Gas Industry. From the standpoint of the Industry it was of great interest and importance to learn how the problem was being tackled in the industrial field. On the other hand, they in the Gas Industry were constantly reminded of the fact that the domestic chimney was now looked upon as the greatest of all obstacles to smoke abatement effort. This state of affairs would undoubtedly continue unless a combined effort was made by all concerned to prove that the use of solid fuel in domestic practice can be entirely dispensed with. Many would point out that in many new housing schemes and garden cities the use of solid fuel was now being restricted to the rate of probably one fireplace per house, but to his (the President's) mind, that point was one of the chief causes of all the trouble and adverse public criticism. If these houses were designed so that solid fuel grates must be installed it seemed logical to say that if they of the Gas Industry could prove to architects and builders that these were unnecessary, and that gas appliances were available and capable of giving better service at economic rates, they would have advanced still further in the fight for a purer atmosphere.

Mr. J. LAW, Chief Smoke Inspector for Sheffield, said it was a pleasure to be present to hear another able Paper by one who was doing an important work in Sheffield for the Gas Industry and for smoke abatement. Dr. Fells was to be complimented on his observations, which showed he possessed a knowledge of the difficulties met with in the steel industry such as very few people had taken the trouble to estimate. His historical review on smoke abatement work was helpful and refreshing, but he had omitted to mention that as far back as 1672 there was effort in this direction, for it was on record that a man was executed for persisting in the use of coal after a Royal Proclamation had forbidden it. "We are not so drastic in these matters to-day," said Mr. Law, "but there are one or two coal users in my area whom I should like to put down on the list for future treatment, should those 'good old days' return." [Laughter.] Referring to smoke legislation, Mr. Law said he could assure enthusiasts that, although the Public Health Act granted a provisional exemption for the steel manufacturing processes outlined by Dr. Fells, the authorities were and always had been of opinion that that fact did not grant a total exemption, and that these people were liable to be taken to task for smoke emission at any time. In 1926 a "Gentlemen's Agreement" had been made that until the time arrived when the authorities were satisfied the problem of meeting the difficulty had been solved in practical manner, no proceedings should be taken. A five years' provisional exemption ended in January, 1932. The authorities had faithfully kept to that agreement in order to give the manufacturers ample time to reconstruct their furnaces. In 1932 it was not felt that the time was opportune to press forward with enforcement of the Act and further exemption was allowed, but, of course, there must be a limit to this period of grace. He felt it would be agreed that co-operative measures were best if at all possible and that prosecution tended to raise a barrier of hostility which was often difficult to surmount for the common good. Though it slowed down the work considerably, the results obtained by co-operation were better in the end.

Dealing with technical and metallurgical considerations, Dr. Fells had given a picture with which he (Mr. Law) was not entirely in agreement. Though oxidation and decarburization did occur, as stated by Dr. Fells, he (the speaker) considered the "margin of safety" was a fairly broad one. When he listened to works managers and engineers discussing non-oxidizing atmospheres and later had to inspect some of the many furnaces in operation, offending every law of combustion, and in which they were hoping to obtain the desired atmosphere, the problem was not really so formidable, because there was any amount of scope for improvement of those furnaces. Purchasers of steel, however, were demanding "thermal histories" of the material and more exacting conditions of finish, which could not be obtained from many of the types of furnaces in operation. Very few manufac-

turers took the trouble to examine the atmosphere existing in their furnaces, so the extreme importance of it was not, he felt, quite so great as Dr. Fells would have his hearers suppose. In summarizing the results of research, Dr. Fells had stated that black smoke was difficult and costly to avoid in coal-fired furnaces. The remarkable part of the research work was that it had proved that comparative smokelessness could be attained in almost every process, irrespective of the type of fuel used.

Gas the Best Fuel.

"Naturally," said Mr. Law, "the best type of fuel is town gas—there can be no doubt about that—because of its purity and its simplicity in handling and control. In describing the increased use of gas, Dr. Fells drew attention to the fact that the 'heavy' engineering trades in Sheffield have been the best customers; and in this regard I should like to suggest that the policy of giving preferential price terms has not altogether been a wise one. My own feeling is that a more uniform distributive load would be obtained by catering for the many smaller works as well as the big ones. The large companies are in a position to dictate terms or to put down their own producer-gas plant, but the smaller works are not in that happy position. The difference in prices for the smaller works on the sliding scale has almost ruled out gas as a competitive fuel and the small man was, and still is, compelled to look elsewhere for his heating. It is quite in order, I agree, to have a sliding scale for prices of gas, but I do not think that scale should be such as to be prohibitive to the small user. Dr. Fells admits that there is not sufficient gas for all potential consumers at the present time, should they all demand it, and it is probably doubtful whether the Sheffield Gas Company will ever be able to produce sufficient gas for all manufacturers—much as we and they would like them to achieve that objective. The present demand of 7,000 million cu.ft. per annum represents only about 10%, or perhaps a little less, of the total fuel used in the Sheffield steel industry, so there is ample opportunity for further expansion."

Recently, continued Mr. Law, a number of conversions had been carried out for the use of pulverized coal fuel, and a number of mechanical stokers fitted; but it must be kept in mind that solid or powdered fuel would always take a part of the industrial load, which meant that there would always be work for the smoke inspectors to do. This brought his mind to another point about gas—the use of crude coke oven gas. Many complaints had been made in the area of fumes emitted from these furnaces. Tests carried out had shown heavy concentrations of sulphur-dioxide—much stronger than that of many chemical works—and this was likely to become a menace. Mr. Law wondered whether Dr. Fells would be in agreement with him in advising the prohibition of crude gas altogether.

"Please do not think," he concluded, "after hearing Dr. Fells, that Sheffield is now a smokeless city or anything like it. It is just as dirty as Leeds, and there remains a great amount of reconstructional work to be carried out. The work is slow, the conservative spirit is strong, but we are trying. Smoke abatement is not making the progress it should make, because of the apathy of the people and the administrators throughout the country. Your campaign of the British Commercial Gas Association is helping, and if we can obtain more speakers of the calibre of Dr. Fells we shall soon awaken a new spirit in England which will demand the abatement of the smoke nuisance, whether industrial or domestic."

Margin of Safety.

Dr. FELLS said he appreciated the observations of Mr. Law. It might be that in the Paper he had over-stressed the point as to margin of safety in respect of scale, but he would point out that as the processes in the heavy industry advanced from stage to stage the margin became less and he was prepared to go so far as to contend that in the final stages, and in annealing, there ceased to be any margin of safety for surface damage. On the matter of examination of furnace atmospheres, there was no need for this in gas-fired furnaces, as the atmosphere in them was kept constant all the time. The matter of gas prices and preferential rates was outside the scope of Dr. Fells' activities, but he agreed it was a matter calling for most careful attention. In answer, however, to Mr. Law's argument that at Sheffield they gave big works a preferential treatment which more or less cut out the smaller works, he should point out that the large firms in the heavy industry comprised about half the Sheffield industrial gas load and the remainder were small works consumers who, it should be added, took every advantage of what the sliding scale of charges offered them. Mr. Law had his opinion on crude coke oven gas and so had he (Dr. Fells). It was a matter, he was afraid, which "smelled of more things than sulphur dioxide. He was not in a position to answer Mr. Law's question direct, but he could rest assured that the Gas Industry was giving the most careful attention to the sulphur problem.

Mr. E. R. B. FRENCH (Leeds) said in Leeds and most other districts the main development of gas as a fuel was in the domestic load, and he would like to hear what Sheffield were doing in overcoming the familiar problems of developing that load.

Mr. LAW—to whom Dr. Fells referred Mr. French's question—said that in a city of some 125,000 houses there were about 85,000 gas cookers and 8,000 electric cookers. Coke for domestic heating was not available in Sheffield as in most places, their coke oven product not being suitable like that of the gas retort. Their total available coke was only about 800 tons per week to meet a demand of anything up to 1,100 tons. It was true that in general the domestic chimney was heavily responsible for the smoke menace, but in Sheffield it was not so great a factor, in proportion to industrial, as in many places. The proportion in Sheffield between industrial and residential was in the region of 3 to 1, whereas in Liverpool the proportions were about 50/50, and at Southport, almost entirely residential, the smoke was 100% domestic.

Mr. FRENCH spoke of considerable success being attained at Leeds in persuading the municipal and other housing authorities to install grates which, if the open grate had to be installed at all, were capable of burning gas-works coke.

The PRESIDENT (Mr. Wylie) congratulated Leeds on this success, which he said must be regarded as an important forward step.

The Lifeblood of the Industry.

Mr. C. S. SHAPLEY, Leeds City Gas Engineer and General Manager, said he had come to listen that day rather than speak, but on hearing Mr. Law's statement that Sheffield was as dirty as Leeds he could not resist, as one who had spent some years in Sheffield formerly, expressing his conviction that Sheffield was dirtier than Leeds. The statement that Sheffield had developed gas demand to such an extent that now they could hardly produce enough gas to meet it was somewhat alarming. Mr. Shapley agreed that everything possible must be done to cultivate the demand for industrial gas and within their industrial limits they were doing their utmost in that direction in Leeds. At the same time, the very lifeblood of the Gas Industry was the domestic consumption and he could not agree with a policy of developing industrial consumption by preferentially low rates which meant that it had to be done at the expense of the ordinary consumer. In his own days in Sheffield the average price of gas, he believed, was about 1s. 3d. per 1,000 cu.ft. To-day, if he understood correctly, the domestic consumer was paying about 2s. 10d. in order that the industrial user should get it at about 8d. They must be careful in the Industry not to get a wrong idea on the development of industrial gas uses. "Personally," said Mr. Shapley, "I am a high price man for gas every time so long as it can be got, but I do not believe in making the price higher for one section of consumers in order to attract another. You can go to needless lengths, in my opinion, in reducing the price for special purposes." Mr. Shapley recalled a recent appeal for a special price for fish friers, but he had failed to be convinced that that particular industry was justified in special favours over others, or that it proposed to reduce the price of its own commodities to the public or give them more for their money by getting cheaper gas.

Mr. H. J. HODSMAN, of Leeds University Fuel Department, after complimenting Dr. Fells and Mr. Law on their efforts in Sheffield, said he was particularly interested in the references to pulverized fuel. Frankly, he had been looking into this a good deal and the more he saw of it the less he liked it. Half the ash was liable to go up the chimney unless elaborate means were taken to prevent it. He recalled being intensely impressed, during a visit to Germany, with the notable cleanliness of the city of Essen, with its great industrial activities, and learned that it was due to the use of gas for industrial heating. Mr. Hodsman expressed thanks for the kindly references by Dr. Fells to the part played by Leeds University and Professor Cobb and the staff of the Fuel Department in researches in the endeavour to eliminate the smoke evil.

Mr. C. A. NEWHAM (Leeds), moving thanks to Dr. Fells and Mr. Law, commented on the remarkable fact that a century had passed with the old prejudice against smoke abatement still existing. The Gas Industry to-day was faced with the difficulty of removing another similarly troublesome prejudice in favour of the open coal fire and against the use of coke if an open fire must be installed. Mr. Newham said he had been much impressed by the statement that a single Sheffield works had saved 40,000 tons of coal a year by using gas, and lest some of the Industry's friends in the coal trade got unduly alarmed by such figures it might be as well to remind them that approximately that amount of coal was used in making the gas, but under far better conditions.

Dr. FELLS, replying to the vote of thanks, which had been seconded by Mr. E. B. LEWIS (Leeds), voiced his own thanks to Mr. Law for coming to the meeting and for his contribution to the discussion. Dr. Fells, while pointing out again that the question of prices and preferential rates was entirely outside his place in the Industry, agreed that it was a factor of great importance and influence in developing gas loads and must be given the closest possible consideration in its relationship to economic working as well as smoke abatement.

Meters and Standards

From a Lecture to the London and Southern District Junior Gas Association on Jan. 17

by
G. S. J. KNOTT

This Paper sets out in detail the practice of the London County Council in the administration of the Sale of Gas Acts, 1859-61, the Gas Regulation Act, 1920, and the Gas Meter Regulations, 1920. The latter Act amended the Sale of Gas Acts and repealed some of its provisions, notably those relating to the testing pressure and the method of charging stamping fees.

The Council's system of testing embodies every requirement of the above-mentioned Acts and Regulations. In addition, extended tests are applied to ensure, as far as possible, that the index proper records accurately.

For general use the dry meter is now being universally adopted by all Gas Companies. Great improvements have been made in recent years and from the old "lights" type of dry meter has evolved the present high capacity meter. By increasing the dimensions of the inlet, outlet, channels and ports, by strengthening the working parts and improving the type of leathers, and by adapting the whole of the top of the meter as a valve chamber, it has been found possible to work a high capacity meter at 8 times the rate of the old lights meter. When this type of high capacity meter was introduced, serious doubts were felt by the Gas Industry as to whether or not it would bear the strain imposed upon it. Such fears have proved groundless and the writer is able to vouch, from his experience of the results of retesting these meters after years of service, that they have maintained their accuracy to a surprising degree. The tests applied to high capacity meters are more stringent than for the old "lights" type, for these meters are required to register accurately at their high capacity rate, and also at 1/5th or 1/10th of that rate. Few of the original dry meters would pass the latter test.

The following is the procedure in the testing of meters:

Examination.

The meter is first examined to see that the number, capacity per hour, and capacity per revolution or complete action of the meter are correctly marked upon it, that the index is of the prescribed form, and that the pointers are in proper relation to each other. The case is examined for visible signs of leakage. Should it be suspected that oil is exuding from the case, the part under suspicion is cleaned and marked, and after testing further carefully examined to ascertain if there is any return of the oil. Should the presence of oil be detected the meter is rejected as being unsound, although under pressure it had stood sound by the gauge. The logic of this is that where oil can percolate, gas will surely follow.

The details of the meter, No., size, index reading, &c., are entered upon a test sheet, and after the completion of the testing, the results are recorded in the official registers.

The meter is tried for back stop. The necessity for a back stop is to debar a consumer from fraudulently connecting the supply service pipe to the outlet of the meter, and thereby reducing the amount already registered by the index.

Soundness.

The meter is then tested for external soundness; the outlet is plugged and the prescribed pressure of 5 in. is applied. A slope gauge, fitted between the holder and the meter, also receives the applied pressure, the water being forced along the scale and reaching a height of 5 in. The pressure is shut off, leaving the meter and gauge charged. The water column in the gauge will remain constant if there is no leakage from the meter, but should there be an escape the water column will fall. In this way the most minute leak will be detected after about 3 minutes. Temperature sometimes interferes with this test, for if the meter is warmer than the air intake the air will expand and slightly increase the height of the column in the gauge. Conversely, should the meter be of a lower temperature, the air contained under pressure will contract, and the loss shown by a fall on the gauge. This difficulty is overcome by prolonging the test, for if there is leakage the fall in the gauge will be progressive.

Registration.

The Act provides that meters registering within the limits of 3% in favour of the buyer, or 2% in favour of the seller shall be deemed to be correct and may be stamped.

The test for accuracy of registration is applied as follows:

Each meter is provided with a test pointer and circle. The amount registered by the test pointer is carried by gearing to the index proper.

The pressure on the holder is reduced to 2 in., which is the prescribed pressure for applying the test for registration. The reason for this low pressure is to ensure that, in whatever area or position the meter is fixed, it will deliver its full quantity at the lowest pressure on the supply service of any gas undertaking.

Air is passed through the meter until the test pointer has moved to the numeral 1. The holder is then placed at zero, and air is passed through the meter at the exact rate of flow per hour as described on the meter, the rate being regulated by a cock on the outlet of the meter. When the test pointer has moved to the first division on the circle, comparison is made with the holder, and the reading marked on the meter. When the test pointer has completed a revolution of the test circle the supply is shut off and the 2 or 5 cu.ft. registered by the meter is compared with the scale on the standard holder. If the result obtained is well within the prescribed limits of accuracy, the test is considered satisfactory, but if near to either margin, the test is repeated.

The next registration test is applied at the rate of 100 revolutions per hour—*i.e.*, should the revolution of the meter be declared ·1 per revolution the rate for this test would be at 10 cu.ft. per hour. The meter must register correctly within the limits at this rate also.

Absorption of Pressure.

Coincident with the test for accuracy of registration is the test for absorption of pressure. Under the Regulations a meter may not absorb more than 5/10ths pressure or show undue oscillation. Attached to the inlet supply before entering the meter is the slope gauge previously used for the soundness test. It is now also connected to the outlet service from the meter and becomes a differential gauge, that is, it records only the difference between the inlet and outlet pressure. After making allowances for our own fittings loss, and allowing for the handicap to the meter by using air for this test instead of gas, the remaining loss of pressure on the outlet is attributed to the meter, and if in excess of the prescribed toleration of 5/10ths is rejected.

Oscillation will be shown by an intermittent rise and fall in the stream line of the gauge. It is the most dangerous of all defects, for this reason. Gas fires fitted in bedrooms and all gas heating appliances are fitted to give perfect combustion, —*i.e.*, the proper admixture of gas and air. It may happen that after ignition, owing to a draw on the gas supply by the meter, the gas may light back into the supply cock of the appliance, or "pop" out altogether. The pressure on the meter having overcome its resistance, there is the danger of the gas passing to the fire unlit. This may appear an unlikely contingency, nevertheless it once occurred in the writer's house and it is suggested that the possibility of it happening is not remote. Meters which are noisy in working are rejected as likely to develop friction or cause annoyance to a consumer.

Internal Soundness.

The prescribed pressure for the application of this test is 5 in., and the rate of flow must not be less than half a foot an hour. Usually for small meters air is passed at the rate of 0·6 cu.ft. per hour, increasing according to the size of the

meter to a maximum of 6 ft. per hour. There is no degree of accuracy required to pass this test, providing the meter works, but the amount of air taken by a meter to complete a revolution must have some relation to the amount recorded. It is a common belief that a meter has a permissible amount of unregistered gas it may pass, according to its size. This is quite wrong. Half a cubic foot only is allowed, and any meter found to be passing gas in excess is rejected, by virtue of the provision in the Sale of Gas Act—viz., that no meter shall be stamped which registers unjustly by any means practically prevented in good meters.

The meter having passed all the prescribed tests, a further quantity of air, making a total of not less than 20 cu.ft. in all, is passed through the meter to check the accuracy of the 100 hand, and if this hand is found to be in order, the meter is stamped.

Disputed Meters.

The foregoing tests are applied to all disputed meters received from service, and in addition the tests for registration are repeated until stable and confirmatory results are obtained. A certificate is issued in respect of each disputed meter.

It may be helpful to set out the official wording on a certificate and to explain its import and the cause of the various errors.

(1) 5·26% *fast.*

Explanation.—Owing to slight shrinkage in the leathers, their holding capacity has been reduced and 95 cu.ft. only has been delivered for 100 cu.ft. registered.

(2) 5·66% *slow.*

Slight expansion of leathers, holding more and delivering 106 cu.ft. for 100 cu.ft. registered.

(3) *Correct.*

Correct within the limits provided by the Sale of Gas Acts—*i.e.*, 2% fast or 3% slow.

(4) *Correct.*

Unsound.

This certificate is frequently contentious, the consumer claiming that his increased consumption is caused by the leakage.

Explanation.—The certificate clearly shows that the meter registered correctly. The leakage in the meter was minute and not measurable, and had no effect on the accuracy of the registration. It must be borne in mind that in the test for accuracy, such leakage from the meter continued during the testing. Should the leakage in a meter be such as to influence the registration, a special certificate form is issued which states that owing to the condition of the meter it is not possible to certify its accuracy under conditions of normal working.

(5) *Correct.*

Absorbing excessive pressure.

Explanation.—Correct in registration but absorbing pressure in excess of the 5/10ths permitted.

(6) *Correct.*

Caused defective lights (oscillation).

Correct in registration but owing to friction in working the pressure on the outlet is intermittently reduced, causing a draw on the lights.

(7) 5·26% *fast.*

Passed 8 cu.ft. per hour unregistered gas.

This certificate is often claimed to be contradictory, but the following explanation will show that it is not so. The leathers have contracted, and, holding less, they have delivered short measure when working at their full capacity, with the result as shown. In addition there is a minute perforation of the leathers or a slight corrosion on the valves. The test for registration is made at 2 in. pressure, whereas the test for unregistered gas is at 5 in. pressure. The free and fast movement of the leathers or valves when the meter is delivering its full rate, at a low pressure, does not allow the gas to escape through the perforation. Upon the premise that gas, or air, follows the line of least resistance, it is obvious that if there is a free way throughout the outlet, gas will pass through it and not through a pin hole. The test for unregistered gas is separate. At 5 in. pressure the rate passed through the meter commences at under 1 cu.ft. per hour. If the area of the perforation is greater than that of the opening through which the gas or air is allowed to pass, it follows that the gas will pass through it without the meter functioning. The draw from the meter is increased by low stages, and the rate of flow of the air or gas is ascertained in each case. In this example there was no registration up to 8 cu.ft. per hour. Beyond that amount the meter commenced to register and completed a revolution.

(8) 9·09% *slow.*

Passed 28 cu.ft. per hour unregistered gas.

In this example the perforation was large enough to affect registration, even when the meter was working at its normal speed.

(9) *No registration.*

In view of the fact that the meter had registered in service, this certificate has sometimes been thought to be inaccurate. The explanation of the result is as follows: The test for registration must be applied at the badged capacity of the meter per hour. We may not test beyond that rate, and if there be no registration that fact must be certified. Most meters will commence to register if worked beyond their capacity, the reason being that the volume of air or gas that is being passed through the meter exceeds the amount that can escape through the perforation.

Special Examination of Index.

The Council has authority, at the request of either buyer or seller, to dismantle and examine the index and mechanism of a meter. A special report is issued in respect of such examination.

Testing "in Situ."

The inspector, at the discretion of the Council and upon the request of either buyer or seller, may attend premises and test large meters. The tests applied are similar to those already described, except that the method of application is different. The pressure authorized is the district pressure normal to the particular meter.

Vote of Thanks.

At the conclusion of Mr. Knott's Paper, the PRESIDENT (Mr. S. C. Waldock, Gas Light and Coke Company) said it was very obvious from the Author's remarks that the gas consumer was protected in every possible way. Regarding advances made since 1920, Mr. Knott had not mentioned the two-coin meter, which the President thought a great improvement both when regarded by the consumer and the gas undertaking. He could claim to have had something to do with meter improvement for, when he was in the Gas Sales Department of the Gas Light and Coke Company, Mr. Stephen Lacey asked him what could be done in the direction of getting rid of some of the badges then covering up the meter casing, and eventually they whittled these down to one. On the question of standardization, he said that one manufacturer had to make over 200 different types of meter to satisfy the requirements of the Industry; that seemed a very high figure.

Mr. F. O. HAWES (Tottenham) proposed a hearty vote of thanks to Mr. Knott, who, in reply, said they did feel in all seriousness at the Testing Station that they were part of the Gas Industry and they were only too glad to do anything they could to further its interests.

"Weeds, Weeds, Weeds"

A second and enlarged edition of "Weeds, Weeds, Weeds," by Sir Charles Vernon Boys, has been published by Wightman & Co., Ltd., Regency Street, S.W. 1, price 2s. (by post 2s. 3d.). The first edition was reviewed in the "JOURNAL" for Dec. 1, 1937. Since first publication the Author has received numerous letters giving information which he has utilized in the new edition, and, in his own words, has been able "to change over from the monologue of the first edition in effect to a general conversation with his readers."

DISTRICT CONDITIONS IN RELATION TO THE

Maintenance of Gas-Fired Hot Water Appliances

by

LEOPOLD FRIEDMAN,

Chief Engineer and Assistant Managing Director, Ascot Gas Water Heaters, Ltd.

From a Paper given to the Western Junior Gas Association on Jan. 21, 1939.

Hot Water Load.

The increase in the use of gas during the last few years is due in no small degree to the popularity of the use of the instantaneous type gas water heaters in the homes of the community.

In considering the value of the water heating load it must be remembered that, apart from its advertising value, it is probably the steadiest annual load, being practically unaffected by seasonal variations.

In 1936 only 7% of the total gas used was for water heating. Although no actual figures are available I am confident it is largely owing to the modern development in the sale of water heating by gas during the past three years that this figure has been raised considerably, and it can be increased still more, but it is essential to realize the potentialities of domestic water heating as being a "bread-and-butter" load.

I am in complete agreement with Mr. Masterman's view that ". . . it must be as a service, not merely as a commodity, that the future of gas is developed."*

This is important to the Gas Industry, for its competitors are striving with every device at their command to secure the water heating load, but, by virtue of the special feature of the commodity we are able to offer—the great advantage of being able to liberate large quantities of heat instantaneously—the Gas Industry is placed in a strong position to meet the competition.

As a result of the improvements made in gas water heating appliances during the last few years a complete change has been brought about in the mind of the public with regard to water heating by gas. Where in the old days the consumers were required to manipulate taps and handles which had to be moved in correct sequence for the safe and satisfactory operation of the appliance, the development of the automatic valve and the pressure proof heating coil left only one operation for the consumer to perform—viz., to turn a tap at the bath or wash basin—to obtain a copious supply of hot water.

To ensure success in developing a gas water heating load it is necessary not only to see that the right type of appliance is installed and in the best possible manner, but also to see that its function is clearly understood by the user. Where it is found that the consumer is not using his water heater to the fullest extent a little instruction in the versatility of hot water for domestic purposes in very many cases will put this right. I have found that people who have become accustomed to the limited service provided from the old-fashioned back-boiler fail to realize that they have at their disposal, with gas water heating, a constant supply of hot water at their command and that there is no necessity for them to "cheese-pare" for fear of the water running cold.

There seems to be an idea current in some quarters that the increase in gas consumption brought about by the installation of a sink gas water heater is not sufficient to justify the capital expenditure incurred. With this point of view I must disagree, as, although one must not expect an appliance which only supplies one point to have so large a use as a heater which serves several points, it is, nevertheless, reasonable to expect a consumption of gas through a sink heater of about 50 therms per annum. In confirmation of this we have the results obtained, quite independently from the Gas Industry, by a well-known manufacturer of water softeners who instituted a number of tests to obtain confirmation on this point. The tests were carried out in many different parts of the country and the average results of the investigations showed that the quantity of hot water drawn daily from a sink heater was 9·2 gallons. In some cases figures as high as 12 gallons were recorded, and in one case only was the figure as low as 6 gallons. In my opinion this latter figure may be regarded as exceptional.

Taking the above figures as a basis and assuming the following:

(*a*) Overall efficiency of use, 70%.

(*b*) Average temperature rise, 70° F.

Then:

Average B.Th.U. input per day	=	$\frac{92 \times 70 \times 100}{70}$
	=	9,200
Therms per day	=	0·092
Therms per annum	=	33·5
Additional gas used for pilot, burned twelve hours per day (500 B.Th.U. gas 0·25 cu.ft./hour)	=	5·5
Total	=	39 therms
Or if the pilot is burned 24 hours per day		
Total	=	44·5 therms

N.B.—The overall efficiency taken as 70% is rather high, and 65% is probably nearer that obtained in practice.

It is, I think, not unreasonable to assume that if the consumer used the appliance to full advantage the annual consumption of gas might be even as high as 73 therms, as follows:

TABLE I.

Use.	Quantity in Gall.	Temp., ° F.	B.Th.U. in Water.	Gas Burned, B.Th.U.
Washing up, three times daily	8	140	7,200	11,100
Culinary uses	1	140	900	1,400
Washing clothes	3	120	2,100	3,230
Washing floors	1	140	900	1,400
				17,130

Number in family		3
Inlet temperature of water		50° F.
Efficiency of heater for intermittent use		65% approx.
Gas burned		17,130 B.Th.U.
	=	0·17 therms/day
Pilot on 24 hours at 0·25 cu.ft. of 500 B.Th.U. gas		3,000 B.Th.U.
	=	0·030 therms/day
or with pilot turned off at night		0·015 therms/day
Total for year		73 therms
or with pilot turned off at night		66·5 therms

There are, of course, other uses for domestic hot water not mentioned in Table I. which, if developed, would increase the annual gas consumption.

I should like now to analyze the gas consumption value of the multi-point heater. We have been able to make thorough investigations into the use made of a number of installed appliances and tests have been carried out over a wide area covering many different classes of consumers. The installations investigated have come directly under our own Service Organization.

The figures I am now going to put before you have been restricted to households of two persons living in flats and to houses having from two to seven habitable rooms. You may be surprised at the diversity in the size and type of homes taken for consideration, but we have found that there *is little, if any, relationship between the quantity of gas used and the size of the home.*

In Table II. I have put the gas load values into seven groups, starting with those under 100 therms per annum, and continuing in steps of 50 therms with those between 100 and 400

* The Future of Gas Appliance Design, by Mr. C. A. Masterman.

therms per annum. In each case the only gas appliances installed were a multi-point water heater and a cooker.

In the first column of the table is shown the percentage of the installations investigated falling into each group. In the second column the three largest groups of consumers are

TABLE II.

Load Value Groups, Therms per Annum.	Percentage Investigated Falling Into Each Group.	Percentage Distribution of Two-Thirds of Consumers Having Highest Load Value.	Average Gas Load Value, Therms per Annum.	Average of Three Chief Groups, Therms per Annum.	Proportional Distribution of the Three Largest Groups.
Below 100..	6·4	—	70	70	6·4
100–150 ..	20·3	31·1	199		
151–200 ..	28	40	172	169	66·8
201–250 ..	18·5	28·9	219		
251–300 ..	11	—	264		
301–350 ..	9·4	—	324	310	26·8
351–400 ..	6·4	—	370		

shown and the percentage distribution between those three groups, which are over two-thirds of the installations studied. The third column gives the average load value in therms per annum for each of the seven groups. The fourth column gives the average gas load value in therms per annum for each of the three main groups.

To get a fairer picture of the actual value to the gas undertaking of the installations on the district, we may take a proportional average for the load value of the three main groups of consumers. In the last column against these average load values the percentage of the installations which they represent is given.

Summarizing the data given in Table II. I find that:

The average load value over the entire test is	..	198 therms per annum
The average load value of 66% of the consumers is	..	169 " " "
The next largest group of 26·8% averages	.. ..	310 " " "

This still leaves, however, a rather incomplete picture of the actual value of the multi-point gas water heater, but we can allow for the percentage distribution of the various load value groups. Ignoring for this purpose the very small fraction of the total consumers whose annual load value is less than 100 therms per annum, we arrive at an average figure of 209 therms per annum.

Taking a fair average for the load value of a gas cooker at 80 therms* and the load value of a cooker and multi-point at 209 (93·6% of consumers) by subtraction we arrive at a figure of 129 therms per annum for the multi-point water heater.

This figure again is taken under present-day conditions when many people are still not yet fully "O.D.B. conscious." I am confident that as the standard of hygiene improves and hot water on tap is looked upon not as a luxury but as an actual necessity, the load value taken in my calculations will rise considerably.

The Necessity for Maintenance.

Having considered some aspects of the hot water load and its value to the Gas Industry, I want to turn to the question of the proper maintenance of gas water heaters from the point of view of satisfactory service to the consumer and the economic operation of a hire purchase scheme.

In order to retain the goodwill of consumers and to maintain the prestige gained in recent years by the introduction of the scientifically designed gas water heater, it is most necessary to reduce complaints to a minimum. The best way to achieve this is to institute a regular appliance maintenance scheme, and I shall endeavour to indicate how this can be done at a comparatively low cost, which, if desired, may be included in the hire purchase price of the heater. Alternatively, the consumer can be offered a regular maintenance service for an extra annual charge on signing the agreement, the gas undertaking making it clear that it accepts no responsibility for the appliance should such a scheme be refused. The former arrangement, in my opinion, is more likely to appeal to clients and can, in fact, be used as an additional selling point.

The regular maintenance scheme I have in mind excludes special complaints which occur outside the regular maintenance service. I do not advocate any maintenance system under a loosely worded guarantee for the period of hire purchase, as in practice it can and does give rise to frivolous complaints. The hire purchase terms should include free regular maintenance, but not free service calls, if frivolous complaints are to be discouraged. It has been the experience of our Service Department that with water heaters which have had regular maintenance complaints between visits are very rare.

I fully realize that the attitude of some consumers who are inclined not to bother with the appliance until it is in such a state that its operation is seriously affected does lead to serious trouble, but this can be avoided by a regular, periodic maintenance.

It has been suggested that it is more economical to service heaters only when complaints arise. But, owing to the nature of the fuel with which we have to deal, this is a mistaken policy. The formation of corrosion products makes attention necessary long before the appliance begins to function unsatisfactorily.

When properly organized, the cost of regular maintenance, including two visits per year, should not exceed 4s. 3d. per heater per annum, labour, transport, small replacements, and overheads included. I will enlarge upon this point later. You will, I think, agree that a satisfied consumer increases the possibility of sales of other gas appliances for his house, and from this point of view the small additional expense is well worth while.

I have had occasion to investigate a number of cases of high cost of maintenance and on investigation it has been found that in most cases the appliance has been badly installed and not properly regulated in the first place, and that regular maintenance has not been given. Furthermore, when the appliance was first installed the consumer had not been properly instructed as to its use, with the result that complaints arose which could have been avoided had initial explanation and instruction been given to the purchaser.

Gas.

Pressure Variations

Since the life of the combustion chamber and heat interchanger of a water heater largely depends on the correct initial regulation and maintenance of the correct gas rate a constant pressure of gas at the burner head of the appliance is a most important matter.

With the amount of new building that has recently taken place, and the growth of sales, it is sometimes found that the existing distribution systems are inadequate to deal with the increased gas load required by the use of new appliances and that extensive variations in gas pressure do occur. To make some allowance for such conditions, the design of the combustion chamber of a modern gas water heater is most important and two factors have to be allowed for:

(*a*) The maintenance of complete combustion under pressure overload.

(*b*) Prevention of oxidation on excess gas rate and possible corrosion due to gas rate being too low.

(*a*) Although combustion standards have been specified by the British Standards Institution, it is only recently that manufacturers of water heaters have attempted to design heaters which would conform to these combustion standards. Previously it was thought sufficient to see that the flat flames did not lick or curl, and that the carbon monoxide content of the products of combustion was negligible when the appliance was tested for a few minutes at the normal gas rate. With the introduction of the British Standard for combustion* good combustion has to be maintained at 100% pressure overload for ungoverned appliances, and 50% pressure overload for governed appliances, and this requirement necessitates the careful design of the combustion chamber and heat interchanger.

The introduction of the water-cooled combustion chamber

* Figure taken by a large gas undertaking in England.

* B.S.S. for "Combustion Testing" of Domestic Gas Appliances, No. 717, 1936.

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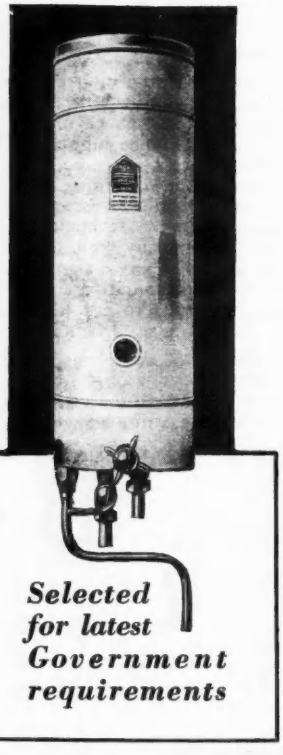

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and the finned type heat interchanger has made this task easier, for the control of the quantity of air drawn in by the chimney effect of the combustion chamber can be more easily controlled. It must, however, be remembered that two problems are involved. One is that of the combustion of the gas and the other the thermal efficiency of the appliance. The figure of 80% now generally adopted as the standard of thermal efficiency make it imperative that the quantity of excess air is kept under control.

(*b*) Corrosion is prevented in the modern gas appliance by a protective coating, lead having been found to be the most suitable for this purpose, as it is the more resistant to the action of the products of combustion than other non-ferrous base metals. There has been a tendency of late to use protective coatings of lacquer, but these have not been successful since the coating peels off after a short period of use.

The design of the cooling coils and the dimensions of the fins of the heat interchanger must be such as to keep the temperature below the melting point of the protective coating and above the dew point. In view of the possibility of gas rate overload a margin of safety must be allowed for, so that oxidation temperatures are not exceeded.

It is with some diffidence that I approach the question of governed pressures on the district, for I realize that it is sometimes impossible to standardize gas pressure throughout the district without great expense. Even if this is done, considerable variations in pressure may occur in the carcass pipes of some premises. The difficulty could be overcome by the adoption of:

(*a*) Service governors, which do not overcome variations in the house carcass pipes, however.

(*b*) Appliance governors.

I note that in Australia governors are almost universally used and I think there is a strong case for their adoption, especially in view of the fact that for modern appliances to give a high degree of service constant gas pressure at the burner is essential.

If appliance governors are to be adopted two types are available—(*a*) the constant pressure type and (*b*) constant volume type. I do not propose to discuss the relative merits of these two types for single-burner appliances, since I have dealt with them fully in an article, "Governors for Instantaneous Gas Water Heaters."*

I would, however, mention that four years of district experience has fully confirmed the view that the constant volume gas governor is much superior to the constant pressure type for single-burner appliances, especially for burners having pinhole perforations.

Variations in Calorific Value of the Gas.

Speaking as a manufacturer of gas appliances, I would greatly welcome the standardization of calorific value throughout the country, for this would make possible the standardization of gas burners and the reduction in price of the apparatus.

While the law demands that gas supplied by any undertaking should be of a calorific value which does not fall below 6% of the declared value, it is usual to find that the average calorific value of gas supplied is approximately 1 to 2% higher than the declared figure, and that the variations from the declared value are negligible.

Apart from the necessity of making a range of burners to suit different calorific values, the small variations that do occur have little practical effect.

Specific Gravity.

Control of specific gravity is not always considered to be of very great importance. The specific gravity of the gas may be increased by mixing air, or inerts, with coal gas, but at the same time this will reduce the calorific value. Such increase in density would affect the operation of the appliance inasmuch as the hourly gas rate would be reduced, giving rise to a lower combustion chamber temperature, to possible condensation, and to corrosion and explosive ignition.

Although the undesirable effects arising from explosive ignition can be partly overcome by the incorporation of a slow ignition device, it is practically impossible to avoid noisy ignition where the flame velocity is very low, due to a large percentage of inerts.

The only way an appliance manufacturer could overcome the difficulty arising out of variations in specific gravity would be to design a constant heat input governor.

Theoretically speaking this is a possibility,* but it would be very expensive and scarcely a marketable proposition.

The control of specific gravity of coal gas is important and is really the direct concern of those responsible for gas production.

Sulphur.

Corrosion is directly due to the presence of various sulphur compounds in the gas, and while the major portion of the sulphur is removed at the gas-works, there still remains about 8 grains per 100 cu.ft. of gas.

The presence of even this small amount has a bearing on the design of an instantaneous gas water heater, and the materials used in its construction should be of such a nature as either to preclude possible corrosion, or else to prevent any corrosion products which may be formed from affecting either the operation of the appliance or shorten its life.

The reaction of sulphur dioxide with the metal with which it may come into contact depends largely upon the presence or absence of such substances as nitric and nitrous oxide and water, and it is for this reason that non-condensing appliances are much preferred to the condensing type. The non-condensing appliance has been made possible by the introduction of water-cooled combustion chambers and by the use of special heat interchangers.

Due to the inert nature of lead it has been found that a coating of this metal offers the best protection against acid corrosion, but because of the great difficulty of its practical application as a coating it is only now coming into general use.

Other Considerations.

In recent years, removal of benzole from town gas has increased. It is considered by some authorities that this has in some measure accounted for the coincident increase in gum trouble experienced on the district. It is said that benzole acts as a carrier for the gum, which is thought to be due to the presence of excess oides of nitrogen in gas..

The tendency to gum formation is increased where the gas is dried.

The presence of gum is a real difficulty where "wire-drawing" of the gas stream occurs and frequent service becomes necessary, which adds partly to the cost of maintenance. With regard to instantaneous water heaters it has been found that the pin-hole type of burner has proved to be singularly free from gum difficulties, since the "wire-drawing" of the gas does not take place until the gas is actually being burned —*i.e.*, at the mouth of the pin-hole, and at this point the burner temperature is such that complete decomposition of the gum takes place. With other types of burner it has been found that difficulty has arisen where the gas has been wire-drawn within the burner at some distance from the point of combustion, the gum formed causing blockage.

Up to the present no satisfactory pilot throttle has been designed to overcome the difficulty due to gum formation. The latest practice is not to use a throttle. Provided the correct size of orifice is used complaints regarding excessive pilot gas consumption should not arise. This is the experience of one large gas undertaking using fixed pilot jets.

Gum formation in governors is more prevalent with the gas pressure governors. It usually occurs on the valve seating causing sticking of the valve. Examination of a large number of volume governors operating on districts where gum is prevalent has proved conclusively that this type of governor is not subject to gum trouble. It is necessary with this type of governor to take special care correctly to design and proportion the orifice and float.

* "GAS JOURNAL," Aug. 5, 1936.

* "Some Practical Aspects of Instantaneous Water Heating by Gas," by Leopold Friedman.

(*To be continued*)

Realism in Selling Gas - - - -

by A. E. CHADWICK,
Controller of Gas Sales, Metropolitan Gas Company of Melbourne.

From a Paper before the Australian Gas Institute.

Domestic sales of gas can only be expressed in terms of sales and use of appliances. Many of us fail to realize that our customers' investment in gas appliances is equal to the whole of our own investment in works and plant, which fact emphasizes the importance and significance of our appliance marketing policy.

As an instance of the effect of this on my Company's profits last year, a reduction of 10% in the selling price of appliances and installations would have represented over £32,000 in loss of profit from their sale. The point here is that had our policy been framed to suffer this loss of profit we would not have secured £32,000 worth of sales promotional value from the lower prices.

I believe in obtaining a good profit from the sale of appliances where the competitive situation permits and where a sufficiently strong demand exists through necessity or can be created through the desire to possess, rather than endeavouring to create a demand through rendering goods available at unnecessarily low prices, especially in these days of easy payments. The latter policy tends to provoke competitors into making offers which eventually lead to senseless and wasteful concessions to customers. Furthermore, it makes competitors of merchants and plumbers, who should be our allies.

There are instances where a reversal of the policy advocated above is not only justifiable but necessary. For example, where tenants are not prepared to finance the purchase and installation of appliances in their landlords' properties and only a rental scheme can get the business, let us have a rental scheme by all means.

The principle of making a good profit where possible and devoting a portion of this to promoting competitive lines is well established and is good insurance for the future of any business. It cannot be said to be losing the substance in chasing the shadow.

The Market.

It is fashionable to advocate market research, and no one will deny that some form of market research is necessary and desirable. We require to know, however, just what we are looking for and how we are to use the information before going too far with research of this kind. We have so many lines of selling endeavour crying out for exploitation that market research, as it is known in many other businesses, has not assumed the importance with us which it will do later. At the same time, we must realize that our activities will be more productive if the best use is made of the energy expended on the selling effort.

We require an analysis of our existing trade and a plan for the future, taking into consideration changing conditions and trends over the period for which we wish to provide.

How far are we justified in looking ahead in planning for the future? I consider that ten years ahead is as far as we need to think, and have set out herein my idea of the likely developments in my Company's gas sales during that period.

These forecasts, not being altogether guesswork, call for some explanation. The dissection of existing consumption is based upon the consumption value of the estimated number of various appliances now in use. The consumption value was obtained by taking figures on appliances used by over 1,000 customers, who were all visited to ensure that our records were correct. We did this, as certain figures published in overseas journals, giving average gas appliance consumptions, seemed quite out of line with our ideas.

The customers selected are a cross-section of typical ordinary meter consumers, including high-class residential areas, middle-class houses, suburban villas and cottages, and workmen's homes in poorer class industrial suburbs. The information secured was particularly interesting, and, without going into complete details, the consumption value of the various major gas appliances with which we were concerned was as follows:

Appliance.	Annual Gas Consumption, Cu.Ft.
Cooker	16,017
Bath heater	6,869
Copper	6,374
Copper, where hot water service is installed	2,427
Sink heater	937
Hot water service (instant.)	17,010
Hot water service (storage)	26,896
Fire	5,316

Where cookers only were installed, the consumption varied from 14,000 cu.ft. to 18,000 cu.ft. per annum. The average consumption of bath heaters was arrived at by subtracting the average cooker consumption from the total consumption where only these two appliances were in use. Similarly, where cookers, bath heaters, and coppers were installed, the additional average consumption was allocated to the copper.

I may mention that coppers were found to have a consumption value rather higher than we expected. It is significant, however, to note that where coppers were installed in addition to hot water services the average additional consumption was reduced by over 60%.

We expected to find instantaneous hot water services accounting for a larger average consumption over and above the gas cooker than 17,010 cu.ft. We do not know just to what extent the hot water service robs the cooker consumption, but the quantity of gas actually consumed in an instantaneous hot water service would be over 20,000 cu.ft. per annum. However, as we have taken cookers as a basis, we are concerned with the additional rather than the individual consumption value of appliances.

It was found that storage hot water services consumed very much more gas than instantaneous services, even in similar type homes. This is accounted for by the fact that customers choosing instantaneous services are often frugally inclined, and, it must be admitted, in many cases have not yet acquired the habit of the daily bath. There is a psychological aspect to this position, as some customers choose instantaneous systems keeping in the back of their minds the fact that their habits will make for greater economy with this type of system.

We confined our investigations on gas fires to customers where one fire only was installed, the variation being from 3,600 cu.ft. in working-class suburbs to 7,956 cu.ft. in better class residential areas.

Apropos the importance of the hot water business, we make an analysis of the hot water services sold and the figures given hereunder for the past twelve months emphasize the necessity of taking steps to ensure that the change-over from single point to multipoint heaters is to gas.

New villas	819
New flats	187
New installations (old homes)	126
Replacing gas bath heaters	514
,, fuel bath heaters	65
,, electric bath heater	1
,, gas hot water services	8
,, fuel hot water services	5
,, electric hot water services	26
Supplied, but not fixed by Company	100
Total	1,852

It must be noted that in allowing for a 25% increase over the next ten years (our total increase over the last ten years has been 9%, including an early decrease and subsequent increase of 19% during the past four years), I am dealing with potentialities and not facts, and other considerations must be borne in mind in planning an extension of sales activities to promote this increased business. Allowance has been made for a period of unfavourable conditions, which means looking into the crystal to some extent.

It is obvious that, whereas in the past sales of gas per customer depended upon the quantity sold to individual

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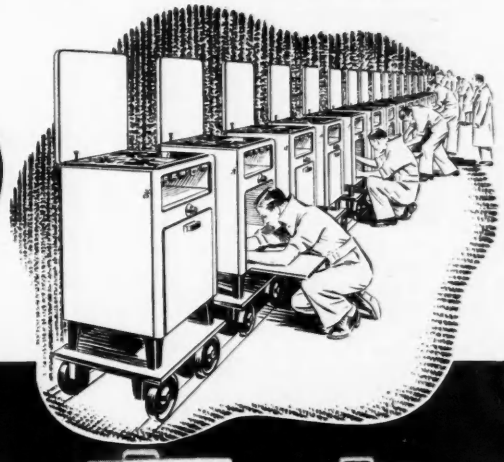

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domestic users, nowadays, to keep up the average, more and more of our gas has to be sold in the highly competitive large volume fields, such as for central heating and commercial hot water services, industrial use, commercial cooking, commercial food processes, &c., and, in the above estimate, provision has been made for this switch-over of business through changing conditions.

There is one fundamental fact common to all businesses and that is that any net profit, however small, is a profit which one loses if one does not get the business. Furthermore, that small profit on large turnover is much to be preferred to large profit on small turnover: the latter is always vulnerable to attack by competition and will eventually fight a retreating battle leading to ultimate extinction or drastic re-organization.

There are three important factors to be considered in putting into effect a programme such as that outlined, which involves increased sales of highly competitive appliances to offset, if possible, losses in the easy selling field as represented by domestic gas cookers. These factors are:

(1) The profit to be made from additional sales of appliances and the incidence of increased sales on costs of selling.
(2) What contributions from profit on sales of gas can be credited against cost of selling appliances.
(3) Adjustment of rates to get business for gas in the highly competitive water heating, space heating, industrial, and commercial fields.

With regard to point (1), it would perhaps be appropriate to quote a graphic illustration of the effect of increased turnover on percentages of salaries in our sales organization in recent years, as an indication of the incidence of increased business on costs of obtaining the business.

Period.	Percentage Increase in Turnover Over 1932.	Percentage of Salaries to Sales Turnover.
1932—June half-year	—	13·6
1933—June half-year	9·36	11·2
1934—Year ended June	30·14	9·6
1935— „ „ „	82·19	7·5
1936— „ „ „	188·32	7·1
1937— „ „ „	270·68	6·1
1938— „ „ „	355·66	5·9

This is, of course, an ordinary example of the influence of increased turnover on overhead costs.

With regard to point (2), we have adopted the principle of crediting a portion of the estimated first year's revenue from sales of gas against cost of selling certain appliances, not including gas cookers, which, as pointed out elsewhere, do not at present need this assistance.

It is interesting to note that life assurance companies generally devote the first year's premium to costs of obtaining their business.

In considering point (3), it is significant to learn that American figures show progressive increases in house heating and industrial and commercial consumption, with a continuing reduction in ordinary domestic consumption year by year. These increases and reductions apply in equal measure to revenue and sales, although sales tend to increase in the house heating, industrial, and commercial sections at a greater rate than revenue.

Consideration of low gas rates calls for investigation into the true costs of supplying gas to customers and wise discrimination in regard to the competitive situation. The future of the gas business is largely wrapped up in this question, which is, therefore, of supreme importance.

There is no clear-cut formula, and it will be found that, in the final instance, as in other lines of business, certain risks will have to be taken in fixing selling prices to meet competition. The judgment of directors and executives who have to decide these questions is the all-important factor, notwithstanding any figures submitted by one of the most important men in commercial life—the Cost Accountant. This judgment factor is what controls finance and, indeed, the affairs of the world. It is the one quality above all others most responsible for success in business.

The sale of domestic gas appliances in a circumscribed and thickly populated area is chiefly a replacement business, as equipment sold to new residences usually replaces, to some extent, old gas equipment used elsewhere. As the effort made by all competitors is greater where new buildings are to be equipped, the primary importance of securing adequate representation in new buildings is apparent, for the propaganda value of this trade is spread over all our business.

I regard the record of equipment installed in new buildings as one of our most significant sets of figures and consider the percentage obtained for gas during recent years to be among our best achievements.

For example, during the twelve months ended June 30, 1938, 3,744 new residences were completed in our area, in which the undermentioned equipment was installed:

Appliance.	Gas.	%.	Fuel.	Electric.
Stoves	3,701	98·8	419	34
Hot water services ..	1,818	77·9	276	338
Bath heaters	1,100		143	—
Coppers	3,269	87·3	443	11
Fires	430	11·4	3,367	10
Refrigerators	35	0·9	1	35

The modern method of selling is to establish a fashion for a product by means of an intensive selling campaign, well supported by advertising and publicity generally. In planning campaigns, we naturally consider the value to gas of the particular appliances featured and keep the various appliances in their proper perspective in relation to the business as a whole.

Sales Organization.

My Company decided to re-organize and expand its sales operations over three years ago.

Orders for domestic appliances are secured in two ways—*i.e.*, indoor selling and outdoor selling. A different technique is employed and salesmen work along different lines in each case, although it is essential that there is the closest co-operation between both groups in following-up enquiries and finalizing orders.

Indoor Selling.—Prospects for indoor sales come from advertising, direct mail, follow-up of previous accounts, display, attractive showrooms, &c. The importance of having good showrooms has been fully realized and most gas companies have provided really attractive premises. If there is any ground for criticism of some of the most modern showrooms, I think it would be that they are rather overdone in the matter of fittings, while being somewhat underdone in providing for the display of an adequate range of appliances. I feel that a "shoppy" atmosphere is conducive to the booking of orders, and, if this can be obtained without crowding, at the same time preserving the modern note, it is an advantage.

The problems connected with efficient staffing and control of showrooms naturally vary with the size of the concern, one of the requirements being to have adequate well-trained staff to cope with peak periods without having surplus showroom staff during quiet hours. For this, a certain amount of flexibility in the allocation of duties in a sales department is necessary.

Outdoor Selling.—Having selected and trained a good outdoor sales staff, their energies must be directed along the most productive lines of endeavour. Generally speaking, there are two methods of securing prospects and working territories:

(1) Door to door canvass, generally described as "cold canvassing."
(2) Providing definite prospects for salesmen by other means.

The first method, which is usually employed on specialty lines, means letting loose on a territory a number of canvassers who work mainly on commission on sales made, their knowledge of the goods sold often being superficial. Ordinary "cold canvassing" is not the most efficient way of approaching our customers. By this method we fail to make proper use of the advantages we possess in having customers on our gas supply.

Furthermore, this does not give our salesmen the standing they require to get the best results from an interview. Duplication of effort is unavoidable with "cold canvassing," as the same ground must necessarily be covered by more than one salesman. Also, usually being done on foot, this tends towards jaded spirits and energies.

The second type of outdoor selling can either be special-

ized or salesmen can be trained to handle a full range of domestic appliances. Specialty selling in our Industry requires that men are trained particularly in the lines upon which they are concentrating—for example, gas refrigerators, and do not attempt to handle enquiries for other equipment.

It is fundamental that whatever method is employed, salesmen should always have a specific reason for approaching a customer.

Our practice now is to have district sales representatives trained in all phases of the ordinary domestic business capable of handling enquiries of all kinds, with the exception of commercial type dwellings, such as guest houses, blocks of flat dwellings, air-conditioning and central heating enquiries; the latter being essentially technical require to be handled by specialists.

We have many sources of obtaining prospects for our district representatives, such as our hire purchase records, records of marriages and births, regular contact with estate agents and plumbers, obtaining information on renovations, &c., but our most prolific source of good prospects is undoubtedly our excellent employees' prospect-bonus system.

The influence of employees in a gas company's business should be tremendous when one considers that there is a gas company employee to every hundred customers. As an indication of the value of our scheme, during the twelve months ended June 30, 1938, our employees provided us with 13,964 prospects, from whom 5,119 orders were secured. Bonus payments amounted to £942.

I am in favour of district representatives handling most of the business in their prescribed territories and of their remuneration being on a salary basis commensurate with their value and ability and comparable with salaries earned by district representatives handling other lines. I believe that small bonuses should be given from time to time and particularly during campaigns to supply some incentive and encouragement for the extra effort. If salesmen are properly supervised and set correct sales quotas and if the spirit of competition is properly fostered, the maximum result will be secured without commission being the main basis of payment.

Furthermore, I think the fairest method of paying commissions is to have pools divided equally among groups of salesmen. After having had considerable experience in controlling salesmen who have been paid in different ways, I have never found the commission system produce superior results to properly controlled and organized selling on a stabilized income basis.

It is economical for district representatives to be provided with light cars, and vehicles of this type pay handsome dividends in time and energy saved.

Hire Purchase Selling.

The facilities which we have for selling on hire purchase are unrivalled, this being our greatest asset and justification for securing profits from sales of appliances. Where it is possible without detriment to the business, it is manifestly foolish not to recover the full complement of charges involved, including interest, cost of collection, bad debts, &c., as this painless method of effecting sales enables trade to be done on a profitable basis. In some respects, it is regrettable that people should tend to buy equipment under hire purchase which their circumstances do not justify, but, as there is constant incentive for customers to purchase equipment which they cannot really afford, we are forced to fight for our share of the hire purchase business.

Many traders have made large fortunes by selling goods at double their value through extending payments over long periods, and unfortunately, the opportunity was never greater for this type of trading. This is made easier by a system of weekly collections which presents difficulties to gas companies, but to which I feel we will all come.

To establish the bona fides, so to speak, of our own sales re-organization three and a half years ago, it may be appropriate at this stage to set out our turnover in appliances, &c., since that time:

Year Ended June 30.	Amount. £.
1934	94,152
1935	131,814
1936	208,594
1937	268,180
1938	329,657

The increases in sales have been made chiefly by special drives and campaigns, and it may be useful to others to have some details of one or two of these sales drives. The first step in organizing campaign selling is to have fixed installation prices, so that orders can be finalized on the spot and not be subject to inspection and estimates. This can be done quite easily and without involving heavy losses on installation work.

Sales Campaigns.

Four years ago, we were selling between 50 and 100 hot water services per annum. The first campaign after re-organization was designed to put gas hot water services on the map. This was done by intensive advertising, offering a special discount of 5% off all prices for a period of four weeks, and using pressure in various other ways. We achieved our objective at that time by booking more orders in one month than in any previous twelve months, and have continued to improve our hot water business year by year.

We shall organize another campaign to effect further substantial increases in sales of hot water services just as soon as we feel confident that the range of water heaters available and market conditions are nearer the ideal. I do not agree that appliance manufacturers are due for high praise for the improvements effected in gas appliances, particularly water heaters, and I feel that very much more remains to be done in this regard. Most of the improvements which have taken place here have been the result of work done by research officers and the gas companies, and, in this connexion, I would like to see much greater expenditure on research and experiment on appliances than at present.

Standardization of working parts of appliances, which has been mildly advocated, should be brought right into the forefront of "things to come."

I feel that, one of these days, we will be charging for water heating on a basis of so much per week, or on a maximum charge based on set quantities, particularly for communal type dwellings, but we do not appear to have reached this stage just yet.

Gas Coppers.

The gas wash copper business is not to be despised as a good avenue for increased business. Our first sales campaign for coppers was in 1936, when we chose the hot weather months of January and February as being a particularly suitable time. At this time of the year the discomfort of stoking fuel coppers is most acute.

During our first copper campaign, we sold more coppers than for the whole of the preceding twelve months and have been improving on our figures each year.

Domestic and commercial gas fires and space heaters had practically drifted off the market in Melbourne in 1934, but, by campaign selling, the position has been restored as shown:

1934..	273
1935..	604
1936..	1,436
1937..	2,501
1938..	2,906

Gas Cookers.

While our gas cooker sales have been substantially increased, our objective has rather been to promote additional sales of these appliances through merchants, at the same time to retain sufficient of the business for us to exercise a dominating influence when we so desire. We estimate that replacement of gas cookers in use in our area is being made at a rate approaching 10% per annum, which we regard as a satisfactory objective.

Refrigerators.

To make the substantial sales to which larger gas companies are committed under present conditions, campaign type selling is required.

The success attending last year's refrigerator sales campaigns was beyond expectations, most companies obtaining orders far in excess of original quotas. This has led to extensions of the Australian factory and very much larger commitments on the parts of companies to take the increased output of the factory. To set ourselves such a task as this represents provides our best incentive to successful selling,

and the propaganda and gas consumption value of the refrigerator business should be realized by all of us.

Co-operation with Merchants and Plumbers.

The whole basis of co-operation with merchants and plumbers rests upon the selling policy of the gas company being framed to make it possible for these traders to make a profit from the sale and installation of gas appliances.

To ensure the real interest of merchants, retail prices must be fixed at profitable levels, and conditions of sale enforced which preclude the possibility of the trade being diverted to one or two price-cutting firms. To retain sufficient influence with manufacturers to ensure that conditions are enforced, the gas company must hold a definite share of the trade.

Present conditions are such that gas cookers are regarded by us as merchants' lines, up to a percentage of the trade, and the discount enjoyed (30% off list prices) is sufficiently attractive to encourage desirable merchants in the business. At the same time, this margin ensures us a profit in our own trading.

As referred to elsewhere, it is questionable whether any reduction in this margin would be a material encouragement to the greater use of gas cooking appliances.

I feel that the reduction in the percentage of electric cooking appliances being installed in recent years is largely due to the substitution of gas cookers for electric cookers in the activities of merchants in our city.

Attempts by merchants to sell water heaters, however, have not been successful, owing to installation problems, and it is in the water heating field that we must encourage the interest of plumbers. There are many difficulties in the way of this, but they are not insurmountable, and we have developed co-operation with plumbers to the extent that the business is reasonably satisfactory.

One of the obstacles to co-operation with plumbers is the type of master plumber who has a good deal to say at Association meetings but whose services cannot be used to advantage by the gas company, owing to his inefficient methods.

It can be said that we would not have been able to carry out our obligations with customers had we not had the assistance of master plumbers during the extraordinary rush of work following our sales activities in recent years.

Industrial Gas Sales.

With domestic sales, the numbers and types of appliances sold are the criteria of the value of the business, but, with industrial gas, the value of the work done can only be expressed in terms of gas consumption.

As the efficiency of utilization governs the proposition in most cases, a highly-trained staff of technical salesmen and designers is required, in addition to continual research on a much greater scale than we have yet engaged in; our expenditure on all forms of utilization research has been disproportionately low.

There is one point in connexion with industrial business which is not sufficiently realized and that is the influence of the use of gas in industrial plants on domestic consumption and on public goodwill. Large industrial concerns have hundreds and, in some cases, thousands of gas users on their staffs, ranging from managing directors to workmen on the basic wage, and the private opinions of these employees are often a reflection of what happens in their business contacts with gas.

Advertising.

Given a sound, progressive marketing policy and an efficient sales organization, the next step in successful selling is well-planned and sufficiently extensive advertising in all its effective forms. Under-advertising is futile, and, in my opinion, leads to greater waste of money than over-advertising. Inadequate and mediocre advertising can be positively demoralizing.

The fate of firms which have cut down their advertising through complacency after reaching what was considered an assured position in the market is well known, and many instances of depreciated business through cutting down advertising could be quoted.

One of the first objectives of our advertising is instilling confidence in buyers' minds that they are following the fashion and, therefore, preserving or enhancing their property values in choosing gas appliances.

Athletic and Social

Mid-Kent Staff Party.

About 80 members of the staff of the Mid-Kent Gas and Mid-Kent Water Companies were present at a staff party given by the Directors of the Companies at Snodland on Jan. 6.

Preston Social and Athletic Club.

Wives and children of members spent a happy time on Saturday at a social organized by the Preston Gas Company Social and Athletic Club. Major Booth and Mr. Walter Davies, Directors, and Mr. J. B. James, Secretary and Sales Manager, gave those present a hearty welcome.

Dover Children's Party.

Nearly 150 guests attended a Children's Party given on Jan. 7 by the Dover Gas Sports Club. The party included tea, an entertainment, and the distribution of presents from a Christmas Tree. The Engineer and Manager of the Dover Gas Company, Mr. R. G. A. Clark, and Mrs. Clark were present.

Children Entertained at Cambridge.

The annual children's party organized by the Cambridge University and Town Gas Light Company's Recreation Club was held on Jan. 7. About 90 young guests sat down to tea in the beautifully decorated clubroom, and, having done full justice to the varied fare, proceeded to enjoy a "talkie" film programme. This was followed by a competition for juvenile talent—a very popular innovation—and a conjuring performance contributed by a youthful magician, 15 years old. Community singing continued at intervals throughout the evening, and at the close a bulging package was given to each visitor, consisting of toffees, chocolates, oranges, &c., and the customary new penny.

South Suburban Children's Party.

A hundred and fifty young guests between the ages of five and 14 were entertained by the South Suburban Gas Company in St. Mark's Hall, Bromley, on Jan. 14. Once again this party for the children of employees—which was instituted in 1910—was a great success. As usual, the slide was a centre of attraction, while after tea there was an enjoyable entertainment and a visit from Father Christmas, who had a gift for every child. Among the visitors present were Mr. V. Simmonds (Chief Engineer) and Mrs. Simmonds, Mr. D. Evans (District Manager) and Mrs. Evans, together with other local officials.

The party was organized by a Committee which included Mr. T. H. Day (Superintendent, Bromley Works), Mr. W. Hickmott (Hon. Secretary of the Bromley Section of the "Suburbagas" Social Club) and Mr. W. M. Judd (Hon. Treasurer).

Hampton Court Gas Athletic Club

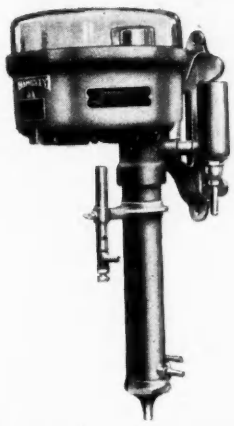
On Saturday, Dec. 31, the Hampton Court Gas Athletic Club held a social evening in their Club House, commencing with a whist drive, then a sing-song of "old timers," after which all joined in dancing up to a few minutes before midnight, when all joined hands and, as the Old Year went out and the New came in, sang "Auld Lang Syne." Then when Mr. Turner had recalled the many happy hours they had had together by the generous gift of their Directors of the Club House, in which they were now gathered, he wished the Company prosperity in the New Year and coupled with this the success of their Athletic Club. Everybody then drank to the prosperity of both out of one of the Cups won by the Football Section in 1938. The success of the evening reflects great credit on the arrangements made by Mr. Ford and the Football Committee, as well as to "Melford Radio," of Hampton Hill, who supplied the music for the sing-song and dancing.

Another happy function was held on Jan. 7, when the members of the Club held their first children's Christmas Party. The party opened with the kiddies' tea, followed by a show of pictures given by Mr. Bushell; it was a real pleasure to all to see the enjoyment of these by the kiddies. This was followed by games and a sing-song in which Mr. Ford got them in a real merry mood, the boys against the girls causing real amusement to all. Then there was a conjuring entertainment for 50 minutes, followed by a presentation to each child of a toy by Father Christmas (Mr. Bumell), who made his entry through a chimney.

TRADE NEWS

"Manesty" Water Stills.

The "Manesty" gas-heated automatic water stills have recently been considerably improved.



The "O" model has been discontinued and replaced by the new "OA" gas-heated still. This new model has an output of 3 pints of chemically pure distilled water per hour and operates entirely without attention. The inlet water enters at the bottom of the condenser and circulates round the tube. It enters the boiling chamber which is filled to a predetermined level, the excess overflowing to waste. The steam condensing in the condenser tube preheats the inlet water to boiling point. This not only conserves heat but expels to atmosphere dissolved gases in the water before it reaches the boiling chamber. Distilled water free from dissolved gases, dissolved solids, and bacteria is thus produced.

The new "Manesty" "OA" still is fitted with a "Pyrex" glass lid and a triple vapour baffle of the same material, which causes the steam to change direction three times before reaching the condenser tube and thus prevents entrainment of raw water in the steam. Another new feature is an automatic water feed regulator which is detachable from the still. This feature greatly facilitates cleaning and should a replacement ever become necessary, a standard unit can be supplied. The "Manesty" "OOO" gas-heated still, which has an output of 2 gallons distilled water per hour, has also been fitted with "Pyrex" glass lid and vapour baffle. Full particulars can be obtained from the manufacturers, Manesty Machines, Ltd., 10, Speke Hall Road, Liverpool, 19.

Hopkinsons' Automatic Emergency Closing Valve.

The Hopkinsons' automatic emergency closing valve is designed for quick closing by simply pressing a button at any remote control station. The valve is of the double-seated balanced type, ensuring easy closing, while positive and quick operation is effected by a weight-loaded lever. It may be operated from as many push-button control stations as desired. Normally the electric circuit is dead, but when contact is made by a push-button, an electro-magnet causes a hammer blow to release a catch, thus allowing the weight to close the valve. "Hammer" on the valve seats is checked by the use of an oil-filled shock absorber.

Alternatively, the valve can be arranged for the catch to be operated by a lever or rope, instead of by the electro-magnet. The valve is re-set by hand, simply by lifting the weight-loaded lever to the full-open position again. Where the valve is inaccessible, a wire rope and pulley can be arranged for this operation. The whole system can be operated from any ordinary lighting circuit or storage battery. The manufacturers are Hopkinson, Ltd., Huddersfield, and 34, Norfolk Street, Strand, London, W.C. 2.

"Rawlplug" Fixing Devices Brochure—10th Edition.

Among the new fixing devices in a brochure recently published by the Rawlplug Company, Ltd., are "Rawlplastic," which is for filling and plugging ragged and irregular holes; plastic plugs, which are in the form of cigarette plugs; screw anchors, which have been produced as a result of some users demanding a plug that incorporates a flange and which could be used for bottomless holes; and the "Rawldrive," which is a screw that can be driven home with a hammer. The firm believe that in this latter device they have a fixing which will be of considerable help to those users who require a sound fixing, but wish to obviate either the time or difficulties sometimes experienced with a screw. It has been found under test that the "Rawldrive" has a far greater holding power than an ordinary nail and in many cases it is claimed the holding power can be greater than that of a wood screw. Used in conjunction with Rawlplugs, the firm guarantee a really sound fixing that takes approximately half the time taken for a wood screw.

Gas Equipment for Varnish and Oil Boiling.

A useful brochure has lately been issued by British Furnaces, Ltd., of Chesterfield, dealing with gas burning equipment for varnish and oil boiling. It is pointed out that as a result of extensive experience, it can be shown that gas, while sometimes more costly on a thermal basis than crude fuels, is more efficient in combustion and more elastic in the application of heat. With full appreciation of all the factors of fuel economy, combustion design, and the general advance of the varnish industry, the firm have developed gas burning apparatus which solve many of the most aggravating problems in heating varnish, &c.

The brochure goes on to deal with the automatic proportioning system and various types of burner, including the hexagonal prism refractory head burner and multi-jet circular burners. The following tables reproduced from the publication give some interesting comparative figures:

Coke versus Gas.

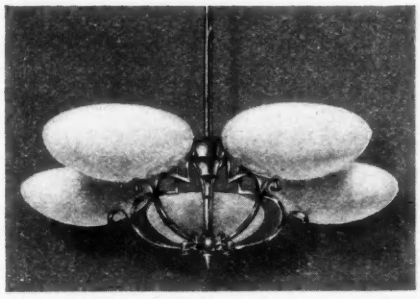
——	Gas.	Coke.
Quantity of gum	65 lb.	65 lb.
Time for first run	33 min.	55 min.
Time for subsequent runs	25 "	45 "
Fuel consumption per lb. of gum run, average	1,505 B.Th.U./lb.	8,500 B.Th.U./lb.

[Gas is supplied at an average calorific value of 500 B.Th.U. per cu.ft. throughout the country and coke at 12,000 B.Th.U. per lb.]

Oil versus Gas.

——	Gas.	Oil.
Quantity of linseed oil	70 gall.	70 gall.
Initial temperature	20° C.	20° C.
Final temperature	300° C.	300° C.
Time to reach final temperature	1 hr. 20 min.	2 hr.
B.Th.U. for initial heating	774,400	1,488,000
B.Th.U. per hour for holding at temperature	72,600	85,500

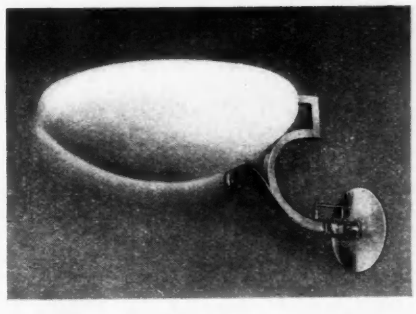
During the maintaining period a certain amount of trouble was experienced with the oil burners and the working was by no means consistent.
[Oil has a calorific value of approx. 171,000 B.Th.U. per gall.]



MODERN LIGHTING FITTINGS

by

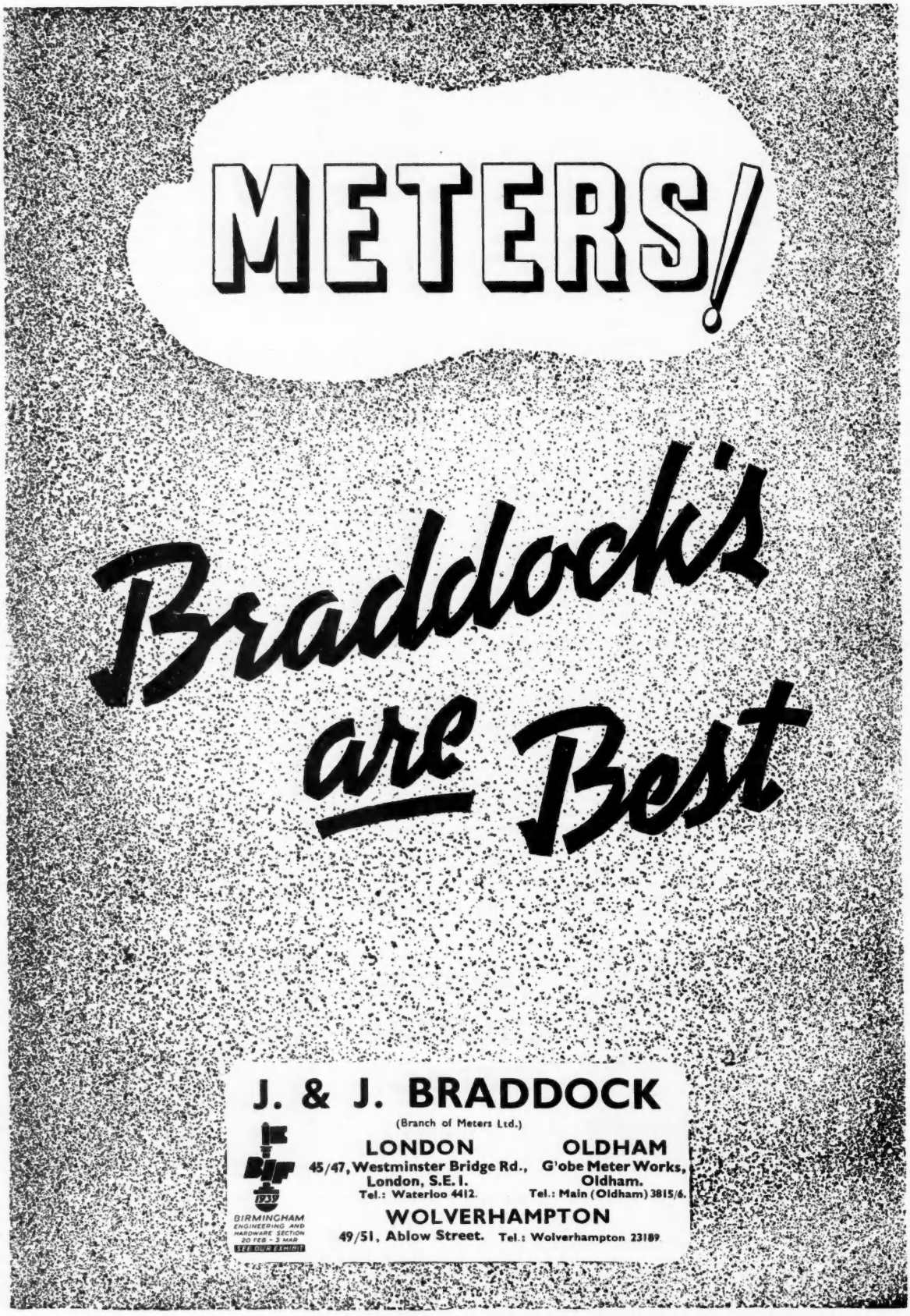
Falk, Stadelmann . .



THERE can be no excuse for abandoning the gas lighting load while such beautiful fittings as these are available. Our illustrations show two examples of their new range of "Pool-Light" fittings by Falk, Stadelmann, & Co., Ltd., of Farringdon Road, E.C. 1.

Various designs of bracket and pendant fittings are available, the latter ranging from two to five light sizes, finished either in toned bronze or chromium-plated with colour relief by the introduction of ivory or pale green on the bodywork of the pendants. The glassware can be obtained in white, pink, or champagne opal flashed, while another interesting feature is that the gas taps form part of the design of the fitting.

All the usual automatic ignition devices can be applied to the "Pool-Light" series by slight modification of the design in order to house the valve. Having seen these fittings in operation in Messrs. Falk, Stadelmann's showrooms, we can say without hesitation that they represent a really remarkable advance in gas lighting equipment.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45/47, Westminster Bridge Rd., London, S.E.1.
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Tel.: Main (Oldham) 3815/6.
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BIRMINGHAM
ENGINEERING AND HARDWARE SECTION
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SEE OUR EXHIBIT

Markets and Manufactures

Current Sales of Gas Products

The London Market

Jan. 23.

Prices generally remain unchanged at the following levels:

Pitch, nominal at about 30s. per ton f.o.b.
Creosote is weaker at about 3¼d.
Refined tar, 3¾d.
Pure toluole, about 2s. 3d.
Pure benzole, about 1s. 9d.
95/160 solvent naphtha, 1s. 7d. to 1s. 8d.
90/160 pyridine, 10s.
All per gallon naked at makers' works.

The Provinces

Jan. 23.

Crude Gas-Works Tar, 14s. to 19s.

To avoid misunderstanding, it is necessary to state that the above price is not claimed to represent a market value. It is a price worked out from week to week upon a system which has been used for many years as a basis for the fixing of certain contracts for crude tar of varying qualities in different areas.

The average prices of gas-works products during the week were: Pitch—East Coast, 29s. to 30s. f.o.b. West Coast—Manchester, Liverpool, Clyde, 29s. to 30s.* Toluole, naked, North, 1s. 7½d. to 1s. 9d. Coal tar, crude naphtha, in bulk, North, 7¾d. to 8¼d. Solvent naphtha, naked, North, 1s. 4½d. to 1s. 5d. Heavy naphtha, North, 1s. 2½d. to 1s. 3d. Creosote, *ex* works, in bulk, North, liquid and salty, 4¼d. to 4⅝d.; low gravity, 4¼d. to 4⅜d. Carbolic acid, 60's, 1s. 7d. to 1s. 10d. Naphthalene, £13 10s. to £16. Salts, 70s. to 75s., bags included. Anthracene, "A" quality, 4½d. to 4⅝d. per minimum 40% purely nominal; "B" quality unsaleable. Heavy oil; Unfiltered anthracene oil, min. gr. 1,080, 4⅜d. to 4⅞d; filtered anthracene oil, min. gr. 1,080, 5½d. to 5⅝d.; heavy tar oil, gr. less than 1,080, 4½d. to 4⅝d.

* All prices for pitch are now quoted on the basis of f.o.b. In order to arrive at the f.a.s. value at any port it will be necessary to deduct the loading costs and the tolls whatever they may be.

Scotland

GLASGOW, *Jan.* 21.

Market is still suffering from lack of demand for reasonable quantities. Any orders being placed are comparatively small.

Crude gas-works tar.—Actual value is about 34s. to 35s. per ton *ex* works in bulk.

Pitch of vertical quality is easy, with makers' prices at 21s. to 22s. per ton f.o.b. for export and round 20s. per ton *ex* works in bulk for home trade.

Refined tar.—This being a quiet season there is little movement, but prices are maintained at 3½d. to 4d. per gallon on the home market, and round 2¾d. to 3d. per gallon for export, both into buyers' packages at makers' works.

Creosote oil.—While individual orders are quite small, the total throughput is not entirely unsatisfactory. Makers' prices are as under: Specification oil, 3¾d. to 4d. per gallon; low gravity, 4¼d. to 4⅜d. per gallon; neutral oil, 3¾d. to 4¼d. per gallon; all *ex* works in bulk.

Cresylic acid.—With new business difficult, prices remain nominal as under: Pale, 97/99%, 1s. 2d. to 1s. 3d. per gallon; dark, 97/99%, 1s. to 1s. 1d. per gallon; and pale, 99/100%, 1s. 4d. to 1s. 7d. per gallon; all according to quality *ex* works in buyers' packages.

Crude naphtha.—Available supplies are commanding 5½d. to 6d. per gallon *ex* works in bulk, according to quality.

Solvent naphtha.—90/160 grade is 1s. 3½d. to 1s. 4d. per gallon and 90/190 heavy naphtha is round 1s. 1d. to 1s. 1½d. per gallon.

Motor benzole is 1s. 3d. to 1s. 4d. per gallon.

Pyridine.—90/160 grade is 8s. 6d. to 9s. 6d. per gallon and 90/140 grade is 9s. 6d. to 10s. 6d. per gallon.

Benzole Prices

These are considered to be the market prices for benzole at the present time:

	s.	d.		s.	d.	
Crude benzole..	0	9½	to	0	10	per gall. at works
Motor „ ..	1	3	„	1	3½	„ „ „
90% „ ..	1	4	„	1	4½	„ „ „
Pure „ ..	1	8	„	1	8½	„ „ „

Contracts Advertised To-Day

Reinstatement of Road Surfaces.
Halifax Gas Department. [p. 253.]

Resetting Horizontal Retorts.
Newcastle-under-Lyme Gas Department. [p. 253.]

Stores.
Halifax Gas Department. [p. 253.]
Lincoln Gas Department. [p. 253.]

Dividend Announcements

Wandsworth and District.—At the annual general meeting to be held on Feb. 14, the Directors will recommend payment of dividends for the half-year ended Dec. 31 as follows: On the 4% Preference Stock—£4% per annum, and on the Consolidated Stock—£7% per annum (both less income-tax). The balance of the revenue account at Dec. 31 was £298,188 (against £280,377). This figure is subject to audit.

Commercial.—The Directors at the General Meeting on Feb. 16 will recommend a final dividend of 2% (less income-tax) on the ordinary stock of the Company, making, with the interim dividend of 2½% paid in August last, 4½% for the year. The balance of the revenue account was £120,579, which compares with £129,133 for the previous year. The dividend for the previous year was at the rate of 5%.

Imperial Continental Gas Association

3½% Debenture Stock

The Imperial Continental Gas Association announces an offer to purchase holdings of its 3½% Debenture Stock, of which there is £171,620 outstanding, at the price of 100% *ex* the interest payable on Feb. 15, 1939.

Watford and St. Albans Stock Sale

The offer for sale by tender of £100,000 4% Redeemable Preference Stock (1959) by the Watford and St. Albans Gas Company was heavily oversubscribed.

Tenders ranged from £100 1s., up to £105. Letters of allotment and regret were posted on Jan. 12.

PROTECT WITH

METROTECT

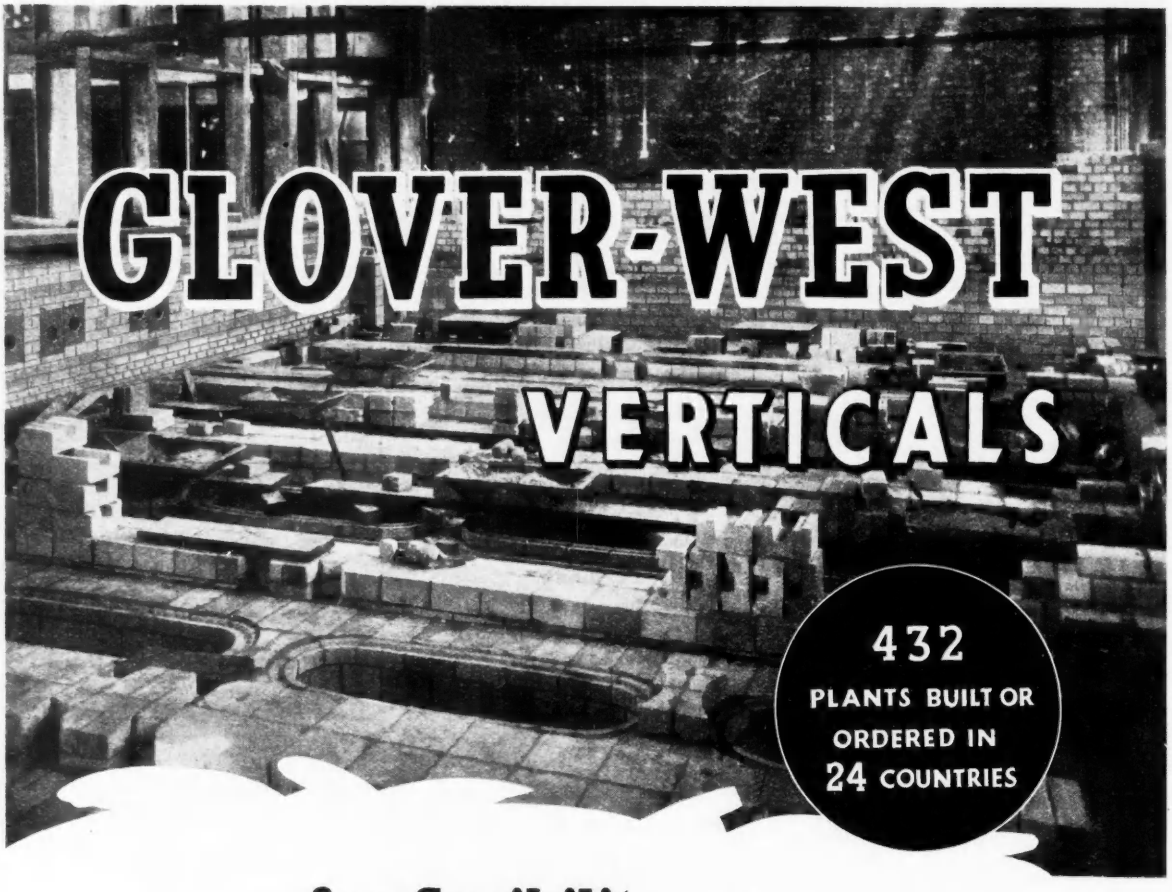
a bituminous paint producing a pleasant satin black finish with highly waterproof and anti-corrosive properties.

Protects steel-work which is continuously or periodically immersed in water. Does not become brittle on prolonged atmospheric exposure. METROTECT flows freely under the brush and can be applied quickly and without effort even in cold weather.

Prices and further particulars from—

SOUTH METROPOLITAN GAS CO.

PRODUCTS DEPARTMENT,
REGIS HOUSE,
KING WILLIAM STREET,
E.C.4.



. . . for flexibility

Plants recently started up have shown again the great flexibility of Glover-West verticals.

A sudden rise or fall in the load creates no difficulties in the retort house. The rate of production can be changed readily over a wide range.

WEST'S

CARBONIZING PLANTS

GLOVER-WEST VERTICAL RETORTS ■ WESTVERTICAL CARBONIZING CHAMBERS

WEST'S GAS IMPROVEMENT CO., LTD., MILES PLATTING, MANCHESTER London Office: **COLUMBIA HOUSE, ALDWYCH, W.C.2**

GAS STOCKS AND SHARES

The Stock Exchange has passed through another quiet and disappointing week. Holders are not realizing at current low levels in the hopes that at some future date prices will harden, while buyers are holding back in anticipation of still lower levels being reached. No wonder, therefore, that the volume of business remains very small. Despite some recovery towards the close, British Funds failed to maintain the previous week's levels, and except for the return to ¼ premium in the new 4% debenture of the Southern Company, home rails also shared in the general dulness. A fair amount of selling took place in the Industrial section and in the absence of support prices drifted downwards. Rubber and oil shares were also dull, though some buying of the latter late on Friday led to a few recoveries. South African mining shares weakened on Continental selling.

Despite the general dulness, the Gas section was again well supported, and that stock coming into the market is speedily absorbed is evidenced by the fact that very few quotations have been marked down. Gas Light units closed 1s. lower at 21s. 6d. and at the time of writing are available at 22s. Subject to the dividend being maintained at £5 12s.% the yield at this price works out at £5 1s. 9d. Commercial dropped 2 on the announcement of a reduction in the final dividend, and Bombay shares closed 1s. lower at 24s. Tottenham was marked up 2 points to 129½, and Imperial Continental 3½% debenture rose 10 points to 99½ on the Company's announcement that an offer had been made to purchase holdings of this stock at par *ex* the February interest. The stock is redeemable at 105 on six months' notice from the company.

The few final dividend announcements for 1938 so far received include the following: Commercial 2% (making 4½% for the year against 5% for 1937), South Suburban 3% (making 6% for the year), and Wandsworth 3½% (making 7% for the year), the last two being at the same rates as a year ago.

In the case of the Commercial the revenue balance has fallen from £129,133 in 1937 to £120,579, while Wandsworth's balance has increased from £280,377 to £298,188.

The Barnet District Gas and Water Company are offering for sale by tender £50,000 4½% preference stock at a minimum price of £110%, the yield at this price working out at £4 1s. 10d.%. Purchasers will receive four months' dividend on Sept. 1 for period Feb. 28 to June 30—future dividends being payable half-yearly on March 1 and Sept. 1. Last day for tenders, Jan. 30.

Official Quotations on the London Stock Exchange

Issue. £	When ex-Dividend.	Dividends. Prev. Hf. Yr. % p.a.	Dividends. Last Hf. Yr. % p.a.	NAME.	Quotations Jan. 20.	Rise or Fall on Week.
1,767,439	Sept. 5	8	8	Alliance & Dublin Ord. ...	130—140	...
374,000	Dec. 19	4	4	Do. 4 p.c. Deb.	93—98	...
734,733	Nov. 7	5	5	Asscd. Gas & Water U'd'ts Ord.	17/—19/–	...
500,000	,,	4½	4½	Do. 4½ p.c. Red. Cum. Pref.	19/—21/–	...
444,389	,,	4	4	Do. 4 p.c. Red. Cum. Pref.	19/—21/–	...
296,523	,,	4	4	Do. 4 p.c. Irred. Cum. Pref.	16/—18/–	...
500,000	Sept. 5	3½	3½	Do. 3½ p.c. Red. Deb. ...	93—98	...
560,070	Aug. 22	7	7	Barnet Ord. 7 p.c.	158—162	...
300,000	Oct. 10	1/9⅔	1/4⅓	Bombay, Ltd.	23/—25/–	−1/–
180,435	Aug. 22	9⅓	9⅓	Bournemouth sliding scale ...	195—205	...
640,407	,,	7	7	Do. 7 p.c. max. ...	157—162	...
495,960	,,	6	6	Do. 6 p.c. Pref. ...	130—135	...
50,000	Dec. 19	3	3	Do. 3 p.c. Deb. ...	75—80	...
312,025	,,	4	4	Do. 4 p.c. Deb. ...	96—101	...
335,000	,,	5	5	Do. 5 p.c. Deb. ...	113—118	...
357,900	Aug. 8	7½	7½	Brighton, &c., 6 p.c. Con. ...	142—147	...
659,955	,,	6⅔	6⅔	Do. 5 p.c. Con. ...	126—131	...
205,500	,,	6	6	Do. 6 p.c. 'B' Pref.	127—132	...
855,000	Sept. 19	8	7	British Ord.	132—137	...
100,000	Dec. 19	7	7	Do. 7 p.c. Pref. ...	138—143	...
350,000	,,	5⅓	5⅓	Do. 5⅓ p.c. 'B' Cum. Pref.	112—117	...
120,000	,,	4	4	Do. 4 p.c. Red. Deb. ...	95—100	...
450,000	,,	5	5	Do. 5 p.c. Red. Deb. ...	100—105	...
450,000	,,	3½	3½	Do. 3½ p.c. Red. Deb. ...	90—95	...
100,000	22May'33	6	4	Cape Town, Ltd.	1—2	...
100,000	6 Nov.'33	4½	4½	Do. 4½ p.c. Pref. ...	1—2	...
150,000	Dec. 19	4½	4½	Do. 4½ p.c. Deb. ...	60—70	...
626,860	July 18	6	6	Cardiff Con. Ord.	118—123	...
237,860	Dec. 19	5	5	Do. 5 p.c. Red. Deb. ...	103—108	...
98,936	Sept. 19	2/–	2/–	Colombo Ord.	1⅛—1⅞	...
24,510	,,	1/4½	1/4½	Do. 7 p.c. Pref. ...	22/6—24/6	...
739,453	Oct. 10	–/11·48	–/11·48	Colonial Gas Assn. Ltd. Ord.	16/6—18/6	...
296,144	,,	1/3·30	1/3·30	Do. 8 p.c. Pref. ...	23/6—25/6	...
1,775,005	Aug. 8	5	5	Commercial Ord.	75—80	−2
140,000	,,	—	§13/4	Do. 4 p.c. Red. Pref. ...	95—100	...
620,000	Dec. 5	3	3	Do. 3 p.c. Deb. ...	71—76	...
286,344	Aug. 22	5	5	Do. 5 p.c. Deb. ...	113—118	...
200,000	,,	—	§30/2	Do. 3½ p.c. Red. Deb. ...	97—102	...
807,560	Aug. 8	7	7	Croydon sliding scale ...	135—140	...
644,590	,,	5	5	Do. max. div.	100—105	...
620,385	Dec. 19	5	5	Do. 5 p.c. Deb. ...	112—117	...
239,000	Aug. 8	5	5	East Hull Ord. 5 p.c. ...	95—100	...
186,155	Aug. 8	6	6	East Surrey Ord. 5 p.c. ...	116—121	...
176,211	Dec. 5	5	5	Do. 5 p.c. Deb ...	112—117	...
250,000	Nov. 7	8	4	Gas Consolidation Ord. 'B' ...	19/—21/–	...
250,000	,,	4	4	Do. 4 p.c. Red. Cum. Pref.	17/6—19/6	...
9,223,324	Aug. 8	5½	5½	Gas Light & Coke Ord. ...	21/—22/–*a*	−1/–
2,600,000	,,	3½	3½	Do. 3½ p.c. max. ...	74—79	−½
4,477,106	,,	4	4	Do. 4 p.c. Con. Pref. ...	97—100	...
2,993,000	Jan. 9	3¾	3¾	Do. 3¾ p.c. Red. Pref. ...	96—99*	...
8,602,497	Nov. 21	3	3	Do. 3 p.c. Con. Deb....	75—78	...
3,642,770	,,	5	5	Do. 5 p.c. Red. Deb....	109—113	...
3,500,000	,,	4½	4½	Do. 4½ p.c. Red. Deb....	107—111	...
700,000	Sept. 5	3½	3½	Do. 3½ p.c. Red. Deb....	93—98	...
270,466	Aug. 22	6	6	Harrogate New Cons. ...	117—122	...
157,500	Mar. 21	1/2⅔	‡1/–	Hong Kong and China Ord....	⅞—⅛	...
213,200	Aug. 8	6	5⅔	Hornsey Con. 3½ p.c....	97—102	...
5,600,000	Oct. 24	12	8	Imperial Continental Cap. ...	118—123	−4
172,810	July 18	3½	3½	Do. 3½ p.c. Red. Deb....	97—102	+10
235,242	Aug. 8	8½	8½	Lea Bridge 5 p.c. Ord. ...	160—165	...
63,480	Dec. 19	3	3	Maidstone 3 p.c. Deb. ...	69—74	...
45,000	Nov. 21	†10	†10	Malta & Mediterranean Metropolitan (of Melbourne) ...	130—135	...
392,000	Oct. 3	5½	5½	5½ p.c. Red. Deb.	100—105	...
231,977	Aug. 22	5	5	M.S. Utility 'C' Cons. ...	99—104	...
968,658	,,	4	4	Do. 4 p.c. Cons. Pref. ...	95—100	...
390,076	Dec. 19	4	4	M.S. Utility 4 p.c. Deb. ...	95—100	...
148,955	,,	5	5	Do. 5 p.c. Deb. ...	112—117	...
125,000	Jan. 3	3½	3½	Do. 3½ p.c. Red. Bds.	94—97	...
675,000	Nov. 21	†6	†6	Montevideo, Ltd.	70—75	...
250,000	Aug. 8	7½	7½	North Middlesex 6 p.c. Con.	142—147	...
396,160	Aug. 8	5	5	Northampton 5 p.c. max. ...	105—110	...
300,000	Oct. 24	†7	†9	Oriental, Ltd.	145—150	...
468,537	Dec. 5	8	7½	Plymouth & Stonehouse 5 p.c.	130—140	...
621,667	Aug. 8	8½	8½	Portsmouth & Gosport Cons.	157—162	...
241,446	,,	5	5	Do. 5 p.c. max. ...	100—105	...
73,350	,,	5	5	Do. 5 p.c. Pref. ...	107—112	...
75,000	,,	4	4	Do. 4 p.c. Pref. ...	90—95	...
114,000	Aug. 8	5	5	Preston 5 p.c. Pref.	105—110	...
247,966	Dec. 19	4	4	Primitiva 4 p.c. Cons. Deb. ...	96—101	...
625,959	Jan. 9	4	4	Do. 4 p.c. Red. Deb. ...	94—99*	...
15,000	Sept. 5	6	6	San Paulo 6 p.c. Cum. Pref. ...	8½—9	...
441,275	Sept. 19	1/1½	1/1½	Severn Val. Gas Cor. Ld. Ord.	20/6—22/6	...
460,810	Sept. 19	–/10½	–/10½	,, ,, 4½ p.c. Cum. Pref.	19/6—21/6	...
133,201	Aug. 22	5	8½	Shrewsbury 5 p.c. Ord. ...	143—148	...
9,000	June 3	4	‡4	South African Ord.	4½—5½	...
1,371,752	Aug. 22	1/2⅔	1/2⅔	South East'n Gas Cn. Ld. Ord.	21/—23/–	...
871 636	,,	–/10½	–/10½	Do. 4½ p.c. Red. Cum. Pref.	19/—21/–	...
498,818	,,	4	4	Do. 4 p.c. Cum. Pref. ...	17/6—19/6	−/6
450,000	Aug. 8	4	4	Do. 4 p.c. Deb.	99—102	...
150,000	,,	3½	3½	Do. 3½ p.c. Red. Deb. ...	94—97	...
6,709,895	Aug. 8	6	5	South Met. Ord.	103—106	...
1,135,812	,,	6	6	Do. 6 p.c. Irred. Pref. ...	128—133	...
850,000	,,	4	4	Do. 4 p.c. Irred. Pref. ...	95—100	...
1,895,445	Dec. 19	3	3	Do. 3 p.c. Deb.	74—79	...
1,000,000	Jan. 9	5	5	Do. 5 p.c. Red. Deb. ...	108—111*	...
600,000	,,	§31/–	3⅔	Do. 3⅔ p.c. Red. Deb. ...	98—101*	...
1,543,795	Aug. 8	6	6	South Suburban Ord. 5 p.c. ...	113—118	...
512,825	,,	5	5	Do. 5 p.c. Pref.	108—113	...
500,000	,,	4	4	Do. 4 p.c. Pref.	95—100	...
250,000	,,	3⅔	3⅔	Do. 3⅔ p.c. Red. Pref. ...	92—97	...
888,587	Dec. 5	5	5	Do. 5 p.c. Deb.	113—118	...
250,000	,,	4	4	Do. 4 p.c. Deb.	95—100	...
200,000	Aug. 8	3½	3½	Do. 3½ p.c. Red. Deb. ...	94—99	...
427,859	Sept. 19	8⅔	9⅓	S. Western Gas & Water Ord.	16/—18/–	...
160,523	Oct. 10	–/10½	–/10½	Do. 4½ p.c. Red. Cum. Pf.	19/—21/–	...
110,000	Dec. 19	4	4	Do. 4 p.c. Red. Deb. ...	93—98	...
750,541	Aug. 8	5½	5	Southampton Ord. 5 p.c. ...	105—110	...
148,836	Dec. 19	4	4	Do. 4 p.c. Deb.	93—98	...
350,000	Aug. 8	5½	5½	Swansea 5½ p.c. Red. Pref. ...	105—110	...
200,000	Dec. 19	3½	3½	Do. 3½ p.c. Red. Deb. ...	92—97	...
1,076,490	Aug. 8	6⅔	6⅔	Tottenham and District Ord.	127—132	+2
409,835	,,	5⅔	5⅔	Do. 5½ p.c. Pref.	116—121	...
62,235	,,	5	5	Do. 5 p.c. Pref.	108—113	...
334,615	Dec. 5	4	4	Do. 4 p.c. Deb.	95—100	...
85,701	Jan. 9	6	6	Tuscan 6 p.c. Red. Deb. ...	95—100*	...
1,131,550	Aug. 22	6	4	U. Kingdom Gas Cor. Ord. ...	18/3—19/3	...
1,051,280	Nov. 7	4½	4½	Do. 4½ p.c. 1st Cum. Pref.	19/—21/–	...
762,241	,,	4	4	Do. 4 p.c. 1st Red. Cum. Pf.	19/—21/–	...
745,263	Dec. 19	4½	4½	Do. 4½ p.c. 2nd Non-Cum. Pf.	15/6—17/6	...
1,066,186	Sept. 5	3⅓	3⅓	Do. 3½ p.c. Red. Deb. ...	96—99	...
375,689	Aug. 8	7	7	Uxbridge, &c., 5 p.c.	125—130	...
133,010	,,	5	5	Do. 5 p.c. Pref. ...	108—113	...
1,371,138	Aug. 8	7	7	Wandsworth Consolidated ...	135—140	...
2,525,768	,,	4	4	Do. 4 p.c. Pref.	95—100	...
1,343,964	Dec. 19	5	5	Do. 5 p.c. Deb. ...	113—118	...
383,745	,,	4	4	Do. 4 p.c. Deb. ...	95—100	...
400,000	,,	§25/–	3⅔	Do. 3⅔ p.c. Red. Deb. ...	96—101	...
558,342	Aug. 8	7	6⅔	Watford and St. Albans Ord.	128—133	...
200,000	,,	5	5	Do. 5 p.c. Pref. ...	107—112	...
200,000	,,	5⅓	5⅓	Do. 5⅓ p.c. Pref. ...	113—118	...
200,000	,,	—	16/8§	Do. 4 p.c. Red. Pref. ...	95—100	...
200,000	Dec. 19	4	4	Do. 4 p.c. Red. Deb....	95—100	...
200,000	,,	3½	3½	Do. 3½ p.c. Red. Deb....	92—97	...

a.—The quotation is per £1 of stock. * Ex. div. † Paid free of income-tax. ‡ For year. § Actual.

Supplementary List and Provincial Exchanges overleaf.

STOCK AND SHARE LIST—Cont.

Supplementary List, not Officially Quoted, London

Issue. £	When ex-Dividend.	Dividends. Prev. Hf. Yr. % p.a.	Dividends. Last Hf. Yr. % p.a.	NAME.	Nominal Quotations Jan. 20.	Rise or Fall on Week.
202,152	Sept. 5	5	5	Ascot Ord.	101—106	...
128,182	Dec. 19	5	5	Do. 5 p.c. Pref.	107—112	...
31,035	Aug. 22	–/4[a]	–/4[a]	Associated Utilities 4 p.c. Pref.	16/—18/–	...
100,000	Dec. 19	3½	3½	Do. 3½ p.c. Red. Deb. ...	95—100	...
17,000	Aug. 22	8	8	Bognor Orig. Ord. 'A' ...	155—165	...
62,210	,,	8	8	Do. New Addl. 'A' ...	155—165	...
87,160	,,	7	7	Do. New 7 p.c. max. ...	145—155	...
37,440	Aug. 8	10	10	Cam. Univ. & Town 10 p.c. max.	188—198	...
125,970	,,	7	7	Do. 7 p.c. max.	133—138	...
39,025	,,	5	5	Do. 5 p.c. max.	97—102	...
96,410	July 18	4½	4½	Cardiff 4½ p.c. Pref.	95—100	...
150,000	Aug. 8	4	4	Croydon 4 p.c. Pref.	97—100	...
130,000	Dec. 19	4	4	Do. 4 p.c. Deb.	95—100	...
65,000	Aug. 8	8½	7½	Eastbourne 'A' 5 p.c. ...	140—145	...
198,000	,,	7	6	Do. 'B' 3½ p.c.	114—119	...
112,312	,,	5	5	Do. 5 p.c. Pref.	107—112	...
130,000	Dec. 19	5	5	Do. 5 p.c. Deb.	110—115	...
24,000	Aug. 8	8½	8½	Great Yarmouth 8½ p.c. max.	43—48	...
59,400	,,	7½	7½	Do. 7½ p.c. max.	33—38	...
51,160	Dec. 5	5½	5½	Do. 5½ p.c. Deb.	120—125	...
152,600	Sept. 5	9	8	Guildford Cons.	163—168	...
54,055	,,	5	5	Do. 5 p.c. Pref.	107—112	...
68,250	Dec. 19	5	5	Do. 5 p.c. Deb.	110—115	...
156,600	Aug. 22	7½	7½	Hampton Court Cons. ...	126—131	...
80,000	Aug. 8	4	4	Lea Bridge 4 p.c. Pref. ...	90—95	...
60,000	,,	6	6	Do. 6 p.c. Pref.	121—126	...
94,876	Dec. 5	4	4	Do. 4 p.c. Deb.	94—99	...
73,620	Sept. 5	8½	8½	Luton Cons. 'A'	153—163	...
107,960	Sept. 19	5½	4	Mid Kent Ord.	8½—9½	...
230,940	Aug. 8	10	10	Oxford & District Ord. ...	195—200	...
47,112	,,	5	5	Do. 5 p.c. Pref.	106—111	...
50,000	,,	6	6	Do. 6 p.c. Red. Pref. ...	107—112	...
126,193	Nov. 7	7½	7½	Peterborough Ord.	137—142	...
64,990	Sept. 5	6½	7½	Redditch Ord....	118—128	...
166,850	Aug. 8	8	8	Romford Ord....	142—147	...
60,000	,,	4	4	Do. 4 p.c. Pref.	99—103	...
44,000	Sept. 19	5	5	Do. 5 p.c. Deb.	112—117	...
25,570	Aug. 8	5½	5½	Rugby 5½ p.c. Pref.	120—125	...
25,000	,,	6	6	Do. 6 p.c. Red. Pref. ...	104—109	...
42,750	Dec. 5	5½	5½	Do. 5½ p.c. Deb.	117—122	...
110,950	Aug. 22	8	8	Ryde Ord.	140—150	...
270,086	Sept. 5	7	7	Slough Ord.	128—133	...
21,000	Dec. 19	5	5	Do. 5 p.c. Deb.	108—113	...
28,872	Nov. 7	5½	5½	S. Midland Gas Cpn. Ltd. Ord.	17/—19/–	...
28,866	Sept. 5	4½	4½	Do. 4½ p.c. Red. Cum. Pref.	17/—19/–	...
117,228	Aug. 8	7	5	Swindon Cons.	102—107	...
60,425	Dec. 5	5	5	Do. 5 p.c. Deb.	110—115	...
64,380	Dec. 19	5	5	Torquay & Paignton 5 p.c. Pref.	105—110	...
130,000	Aug. 8	8	5	Wakefield Ord.	116—121	...
81,650	,,	5	5	Do. 5 p.c. max.	100—105	...
82,000	Aug. 8	6	6	Weymouth Ord.	103—108	...
98,384	Aug. 22	6	6	Wolverhampton 6 p.c. Pref.	118—123	...
160,000	Dec. 19	5½	5½	Do. 5½ p.c. Rd. Db.	103—108	...
90,000	Dec. 19	5	5	York 5 p.c. Red. Deb. ...	103—108	...
133,640	July 18	6½	6½	Yorktown (Cam.) 5 p.c. Cons.	118—123	...
120,000	,,	5	5	Do. 5 p.c. Pref.	105—110	...
35,000	Dec. 5	5½	5½	Do. 5½ p.c. Deb.	120—125	...

BRISTOL EXCHANGE

Issue. £	When ex-Dividend.	Dividends. Prev. Hf. Yr. % p.a.	Dividends. Last Hf. Yr. % p.a.	NAME.	Quotations Jan. 20.	Rise or Fall on Week.
347,756	July 18	6	5	Bath Cons.	117—119	...
1,667,250	July 18	5	5	Bristol, 5 p.c. max.	112—114	...
120,420	Dec. 19	4	4	Do. 1st 4 p.c. Deb. ...	98—101	...
217,870	,,	4	4	Do. 2nd 4 p.c. Deb. ...	98—101	...
328,790	,,	5	5	Do. 5 p.c. Deb.	117—120	...
274,000	Aug. 8	5	5	Newport (Mon.) 5 p.c. max. ...	97—99	...
13,200	Sept. 19	8⅔	7	Pontyp'l Gas & W. 10 p.c. 'A'	12⅔—13⅔	...
13,600	,,	6	5	Do. 7 p.c. 'B' ...	11⅓—12⅓	...
40,000	,,	6	5	Do. 7 p.c. 'C' ...	11⅓—12⅓	...
140,778	Aug. 8	5	5	Weston-super-Mare Cons. ...	106—108	...
64,338	Dec. 19	4	4	Do. 4 p.c. Deb. ...	98—101	...
33,340	,,	7½	7½	Do. 7½ p.c. Deb. ...	149—152	...

LIVERPOOL EXCHANGE

Issue. £	When ex-Dividend.	Dividends. Prev. Hf. Yr. % p.a.	Dividends. Last Hf. Yr. % p.a.	NAME.	Quotations Jan. 20.	Rise or Fall on Week.
157,150	Aug. 8	6½	5	Chester 5 p.c. Ord.	109—111	...
92,500	Dec. 19	4	4	Do. 4 p.c. Pref.	95—99	...
36,430	,,	3½	3½	Do. 3½ p.c. Deb.	87—90	...
41,890	,,	4	4	Do. 4 p.c. Red. Deb. ...	97—101	...
2,167,410	Aug. 22	6	6	Liverpool 5 p.c. Ord.... ...	122—124	...
245,500	Dec. 19	5	5	Do. 5 p.c. Red. Pref. ...	100—105	...
306,083	July 18	4	4	Do. 4 p.c. Deb.... ...	100—102	...
106,280	Aug. 8	10	10	Preston 'A' 10 p.c.	198—208	...
188,219	,,	7	7	Do. 'B' 7 p.c.	131—141	...

NEWCASTLE EXCHANGE

Issue. £	When ex-Dividend.	Dividends. Prev. Hf. Yr. % p.a.	Dividends. Last Hf. Yr. % p.a.	NAME.	Quotations Jan. 20.	Rise or Fall on Week.
122,577	Aug. 8	8	8	Blyth 5 p.c. Ord.	160—162	...
732,000	Aug. 22	5	5	Hartlepool G. & W. Cn. & New	87½—88½	...
2,061,315	Aug. 8	5¼	5	Newcastle & Gateshead Con.	22/9—23/3[a]	...
682,856	,,	4	4	Do. 4 p.c. Pref. ...	100—101	...
776,706	Dec. 19	3½	3½	Do. 3½ p.c. Deb. ...	87½—88½	...
277,285	Oct. 24	5	5	Do. 5 p.c. Deb. '43 ...	103¾—105¼	...
332,351	Aug. 22	6	6	Sunderland 6 p.c. max. ...	135—137	...

NOTTINGHAM EXCHANGE

Issue. £	When ex-Dividend.	Dividends. Prev. Hf. Yr. % p.a.	Dividends. Last Hf. Yr. % p.a.	NAME.	Quotations Jan. 20.	Rise or Fall on Week.
542,270	Aug. 8	9	6	Derby Con.	133—138	...
55,000	Dec. 19	4	4	Do. 4 p.c. Deb. ...	100—105	...
20,000	Dec. 19	5	5	Long Eaton 5 p.c. Pref. ...	10—12	...
80,000	,,	5	5	Do. 5 p.c. Deb. ...	105—110	...

SHEFFIELD EXCHANGE

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